MONITORING, VERIFICATION AND EVALUATION UNIT
AGRICULTURAL POLICY REFORM PROGRAM

MVE UNIT
APRP

Sponsored by:
Government of Egypt,
Ministry of Agriculture and Land Reclamation

United States Agency for International Development/Egypt
Office of Economic Growth, Competitiveness and Agricultural Development Division

THE IMPACT OF APRP AT THE FARM LEVEL

Morsy Ali Fawzy
EQI

Mamadou Sidibe
Abt Associates

Osman Salama
EQI

Abt Associates Inc.

Prime Contractor:
Abt Associates Inc.

Subcontractors:
Environmental Quality International,
Management Systems International

July, 2002

USAID Contract No. 263-0219-C-00-7003-00

Project Office: 15th Floor, 7 Nadi El Seid Street, Dokki, Cairo
Telephones: (202) 337-0357, 337-0592, 337-0482
Fax: (202) 336-2009

Impact Assessment
Report No. 28

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AERI	Agricultural Economic Research Institute
ALCOTEXA	Alexandria Cotton Exporters Association
APAU	Agricultural Policy Analysis Unit
APRP	Agricultural Policy Reform Program
ARC	Agricultural Research Center
ATUT	Agricultural Technology Utilization and Transfer
CAPMAS	Central Agency for Public Mobilization and Statistics
CATGO	Cotton Arbitration and Testing General Organization
CSPP	Cotton Sector Promotion Program
EAS	Economic Affairs Sector of MALR
EPIQ	Environmental Policy and Institutional Strengthening IQC
EU	European Union
FSR	Food Security Research (Unit of APRP)
GASC	General Authority for Supply Commodities
GOE	Government of Egypt
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HC	Holding Company
HEIA	Horticulture Export Improvement Association
HSU	Horticultural Services Unit
IFPRI	International Food Policy Research Institute
IPM	Integrated Pest Management
MALR	Ministry of Agriculture and Land Reclamation
MD	Managing Director
MIP	Market Information Project
MPE	Ministry of Public Enterprise
MEFT	former Ministry of Economy and Foreign Trade (former name of MFT)
MFT	Ministry of Foreign Trade
MPWWR	former Ministry of Public Works and Water Resources (former name of MWRI)
MSHT	Ministry of Supply and Home Trade
MTS	former Ministry of Trade and Supply
MVE	Monitoring, Verification and Evaluation Unit
MWRI	Ministry of Water Resources and Irrigation
PBDAC	Principal Bank for Development and Agricultural Credit
RDI	Reform Design and Implementation Unit
USAID	United States Agency for International Development
WPAU	Water Policy Advisory Unit
WTO	World Trade Organization

ACKNOWLEDGMENTS

The authors would like to acknowledge the wise guidance and scientific advice of Dr. Saad Nassar. Eng. Mahmoud Nour provided encouragement and facilitated contacts. Special thanks go to Dr. Mohamed Omran for long discussions and feedback, and his participation in designing and implementing this study. The authors are greatly indebted to Dr. Gary Ender, Chief of Party of the MVE Unit, for his guidance, participation and support in formulating and implementing this report.

Appreciation should be extended to Eng. Mohamad El Shahed, the head of the Economic Affairs Sector. Without his cooperation and assistance, this study would never have been completed. Appreciation is also extended to Eng. Abd El Razik Hassan, the head of the Central Administration of Agricultural Economics and Eng. Saed El Agaty, the Head of the Sampling Department, for their full support and cooperation.

Dr. Abdel-Hamid Youssef Saad produced the literature review summary that is included in Annex A. Special thanks go to him.

The authors also would like to acknowledge the hard work and dedication of the researchers who conducted the field investigations: Drs. Shaaban Salem, Ali Assem, Bayoumi Abdel Meguid, Emad Wahdan, Ragab Maghawry, M. Alaa Abdel Aziz, Mohamed Hiekal, and Ali Abdel Rahman.

Appreciation is also extended to Dr. Abdel Wahab Shehata for his hard work for data verification and quality. Special thanks go to Dr. Sherif Fayyad for his hard work in handling the data on the computer and assisting in data tabulation.

Special thanks go to Mrs. Yvonne Louis, Ms. Dalia Radwan, and Mrs. Maggie Nabil for their hard work in data entry, tabulation, and file manipulation.

Finally, any errors and omissions should be attributed to the authors and not to the APRP, USAID, or MALR.

EXECUTIVE SUMMARY

By the early 1980s, the performance of the agricultural sector in Egypt had been undermined by policy distortions involving heavy implicit taxes accompanied by government control on both farm production and input procurement and distribution. Land allocation decisions and crop rotations were predetermined by the authorities. Strategic crops including cotton, rice and wheat, among others, were either partially or totally subject to mandatory delivery quotas at fixed output prices. Farm inputs were distributed by the Government through PBDAC at subsidized prices and rationing of the limited supply to the growing needs. Likewise, agricultural trade was under the control of the Government.

To improve the performance of the agricultural sector, the GOE and USAID decided to implement policy reforms in several key areas. In this regard there have been two key programs: the Agricultural Production and Credit Program (APCP) from 1987 to 1996, and the Agricultural Policy Reform Program (APRP), from 1996 to 2002. Under APCP seven tranches of agricultural policy reforms (benchmarks) were agreed to. Under APRP there were five tranches, comprising 151 benchmarks and 242 indicators. Several ministries participated in the program, namely the Ministries of Agriculture and Land Reclamation,;Water Resources and Irrigation; Supply and Home Trade; Economy and Foreign Trade; and Public Enterprises.

The objective of this study is to determine the impact of APRP at the farm level, and if possible, on farmers' welfare. Given the history of policy reform, however, it is clear that some effects observed during the APRP period will have been caused by reforms under APCP.

With this end in mind, the study team carried out a nationally representative survey of farmers and related individuals and institutions. Structured formal interviews were adopted as the survey approach. The sampling technique is very close to what is called a Stratified Multi-stage Cluster Random Sampling (SMCRS). Therefore, the sampling procedure included stratifying the governorates according to the dominant cropping pattern, different geographical locations, and some special issues such as sugarcane improved irrigation technique and extension and research coordination to increase the exports of horticulture crops. The sample frame is the official list frame of MALR. Ten governorates were selected, namely, Ismaileya, Beheira, Kafr El Sheikh, Sharqeya, Daqahleya, Gharbeya, Beni Suef, Minya, Assiut, and Qena. Thirty-one districts and sixty-two villages are included in the sample. Farmers in each selected village were classified into different size of holding groups during sampling to reflect the response of these groups towards the issues under study. With respect to sample size determination, two main constraints were taken into account: 1) the time required to obtain the main findings of the survey and 2) the budget available. After examining these factors, the total sample size was targeted at 750 farms; 745 farm questionnaires were completed.

Turning to some sample characteristics, the number of farmers who completely own their own farms ranged from about 76% in Gharbeya governorate to about 92% and 94% in Kafr El Sheikh and Ismaileya governorates, with an overall average of about 81% for the sample. Pure tenant farmers are concentrated in Beni Suef, Qena and Beheira governorates, and they are all in the small farmer group. Of the farmers in the sample in Beheira, Gharbeya, Assiut, and Qena governorates, about 33%, 16%, 14% and 12%, respectively, are both tenants and owners of their operated farms, ie, those who own only part of their farm and rent the other part. About 47 % of the sampled farmers operate farms less than three feddans, 20% operate

farms of three to five feddans, and about 33 % operate farms of more than five feddans. The percentages of farmers in the sample cultivating the main winter and summer crops in 2000/01 are as follows:

Main Winter Crops				Main Summer Crops			
Wheat	**L.Berseem**	**S. Berseem**	**Fava Beans**	**Cotton**	**Rice**	**Maize**	**Sorghum**
37	33	15	10	26	27	35	4

Cropping Patterns

The elimination of mandatory cropping patterns, when not dictated by technical constraints, was an early achievement of APCP. An early APRP benchmark required that the farmers' freedom to choose cropping patterns remain in place.

More than 97% of the farmers surveyed believe that they are now free to choose their cropping pattern. They mostly consult with other farmers, with neighbors or with family members in doing so. Among farmers who do not change their cropping patterns despite their freedom to do so, technical constraints related to the crop rotations are largely associated with their decision. Regarding cotton, wheat and maize, crop profitability is the dominant factor explaining why farmers change their cropping patterns. For rice, the combination of home consumption, crop profitability and better market opportunities are the main reasons for changing the cropping pattern.

More than 56% of the farmers surveyed started exercising freedom to choose their cropping pattern during APRP, while 36% had already done so under APCP. A comparison of the cropped area between the 1996/97 season (APRP baseline year) and the 2000/01 season (APRP endline) reveals that during the winter season, the cropped area decreased by 2% for wheat, 6% for fava beans, and 1% for short berseem, and increased by 5% for long berseem. For the summer season, the cropped area decreased by 12% for cotton and 5% for maize, and increased by 10% for rice. Cotton is losing popularity among farmers to the benefit of rice in the summer season. The growing adoption of the short-season rice varieties promoted by APRP not only reduces water needs, but also improves rice yield. Partial liberalization of the seed cotton market vis-a-vis more or less full liberalization of the paddy market also makes rice more attractive to farmers.

Input Markets

APRP policy benchmarks promoted the liberalization of some input markets, namely nitrogenous fertilizer and cotton pesticides, especially an increased participation of the private sector in the input distribution system. Seed is the other key input that farmers require. According to farmers' opinions expressed during our survey, they are totally free to buy seed for wheat, maize and rice. In the case of cotton, many of the farmers (73%) feel they are not free to choose their seed dealer because of government involvement. Cooperatives are the source of seed receiving the most mentions as best by growers of cotton, wheat, maize and rice. The reason mostly frequently given by growers of cotton,

wheat, maize and rice for cooperatives being their preferred suppliers of seed is the high quality of their products.

Growers of all crops said that they are totally free to buy fertilizer from any supplier. For cotton producers, the cooperatives are most considered the best source of fertilizer (52% of producers). For the growers of wheat, maize and rice, traders are the most frequently mentioned best source of fertilizer, with each mentioned by around half of the farmers surveyed. The reason mostly frequently given by growers of cotton for preferring the cooperatives as suppliers of fertilizer is high quality. In the case of wheat, maize and rice growers, traders are most often mentioned as the best source of fertilizer because of the availability of their products.

At the time of the survey (fall, 2001), private traders dominated the market for the major fertilizer, nitrogen. For urea and ammonium nitrate they captured 65% and 49% of the market, respectively. The private sector also dominated the distribution of phosphatic and potassic fertilizers. This significant emergence of the private sector in fertilizer markets corroborates the positive impact of policy reforms begun under APCP and solidified under APRP on increasing the private sector involvement in fertilizer distribution. Given the ability of the private sector to handle fertilizer distribution and the preference of the farmers for the private sector as a source of fertilizer, the GOE's apparent move to restore PBDAC's share of fertilizer to about half of the market (after this survey was carried out) is quite surprising.

Growers of wheat, maize and rice said they are free to buy pesticides from any supplier. Cotton producers mentioned cooperatives most often as the best source of pesticides (68%). For growers of wheat, maize and rice, traders are the best source of pesticides, having been mentioned by about half of the respondents. Cooperatives are considered the best source of cotton pesticides because of the high quality of their products and their lower prices (35% of the respondents). Producers of wheat, maize and rice thought that traders were the best source of pesticides because of the availability of the product.

Farmers' opinions of pesticide suppliers should be interpreted in the following context. Under APRP the GOE carried out a major and successful effort to change its role from supplier of pesticide products and services for cotton growers to an institutional role in guaranteeing the quality and safety of these goods and services, while allowing the private sector and cooperatives to take over the actual sale of products and provision of services. (The markets for pesticides for other crops were long since liberalized.) This process was under way during the time of the survey, but had not yet been completed. Cooperatives were always a major part of the institutional setup that provided farmers with seed, fertilizer and pesticides, especially for cotton production. Thus it is not surprising that farmers still prefer cooperatives in this area. Indeed cooperatives were the first suppliers of cotton pesticides tested by the Government when it agreed to make a transition away from supplying them itself. One would expect farmers' opinions to move somewhat in the direction of preferring the private sector as the full effects become felt of the major change in the GOE's role.

Output Markets

Through APCP and APRP the GOE attempted to liberalize the markets for cotton and rice. This would lead to more competition, better prices for farmers, and (for non-cash crops like rice) a higher percentage of crop output sold (although this often increases slowly and steadily even without liberalization). Some traders participate in the marketing of more than one crop; policy reforms vis-a-vis one crop may therefore affect the marketing of other crops for this and other reasons.

All the wheat, maize and rice producers surveyed in 2001 said that they were free to market their output; whereas in the case of cotton, only 40% of the respondents felt such freedom. According to data from a previous survey by the MVE Unit that can serve as a baseline (Morsy, 1998) and from this survey, the shares marketed of wheat, maize and rice increased by 22%, 9% and 13%, respectively, in the 2001 season compared to the 1997 season. (In the case of cotton, the proportion marketed remained about the same, namely very close to 100 percent.) Farmers were about evenly divided over whether since 1997 there had been changes in the market shares of the different buyers.

PBDAC rings, private rings and cooperative collection centers represent the main marketing channels for cotton for 47% , 30% and 13% of the respondents, respectively. Cotton farmers' preferences for the best marketing channel are determined by the confidence they have in receiving full payment and by the price offers they receive. 95% of the respondents said that there were no local cotton traders operating inside their village or nearby.

For wheat, rice and maize, the marketing channels most often mentioned as best are local traders at the farm gate, by 74%, 91% and 90% of the respondents, respectively. The majority of wheat, rice and maize producers prefer to sell their product to traders because they pay cash on the spot.

Among cotton, wheat and maize producers, more than 90% of the respondents said that they could not bargain over output prices at PBDAC rings, cooperative collection centers or private rings. However, price bargaining is possible with traders for these three crops. Price bargaining is practiced over rice at all levels, according to more than 90% of the respondents. 93% of the cotton producers started bargaining over price under APRP. For wheat, rice and maize, most of the producers started bargaining under APCP.

These results are consistent with the pattern and timing of reforms under APCP and APRP. Liberalization of rice and cotton marketing began under APCP and continued during APRP, especially for cotton. Where there is the least remaining intervention by the Government (namely in the three crops other than cotton), the private sector is now the preferred buyer. Private buyers are most likely to compete with each other and therefore bargain with farmers over the price paid. The complicated cotton marketing system, with its limited competition, leads farmers to look at eventual security of payment as a virtue, rather than providing the farmer with true competition for his crop. Reforms to the seed cotton marketing system, including those under APRP, are slowly leading to more competition, but these results show that there is still some distance to go.

Profitability

The results of the current survey allow one to analyze gross margins for the main field crops (and others). However, there is no consistent, reliable baseline set of data available with which to directly compare these results. This is despite some excellent work under APRP to begin the collection of farm income data; unfortunately those data and those of similar surveys under CSPP give widely differing results.

The current survey dataset provides a good baseline for future projects, and the MALR data should as well if their coverage continues to increase and if their accuracy is maintained. The lack of a suitable baseline for this study reinforces the importance of the farm income data work begun under APRP and the need to continue it, with an emphasis on analysis.

Thus the analysis of profitability must be limited to the presumed effects of APRP reforms. Gross margins are used as the indicator of profitability, where gross margin is equal to revenue from the sale of outputs less the total variable costs incurred. The components of gross margin per feddan are thus yield, input cost, and output prices.

Based on a review of the APRP benchmarks, the main effects presumed can be summarized as follows:

- As a project that targeted the marketing and processing of crops more than their production, APRP is more likely to have had an impact on output prices than on inputs and yields.

- In general APRP is not likely to have had a significant impact on either the use of higher-yielding seed or the amount of fertilizer applied (either directly or through changes in its price, which were almost nil), so it is unlikely that APRP reforms had any significant impact on the yield of major field crops (nor were they conceived for this purpose).

- The yield of rice has been going up because of the introduction and adoption of higher-yielding short-season varieties (SSVs). While the original introduction of SSVs is not an APRP project impact**S** it started before APRP**S** the project took advantage of their increasing use to obtain significant irrigation water savings. This significant increase in water use efficiency is estimated in the most recent monitoring report of the MVE Unit (Holtzman et al., 2002).

- The effect of APRP on the pricing of seed cotton has been limited. It urged lower prices when they were too high, and promoted higher prices through competition, which succeeded only to a limited extent.

- The domestic rice market was largely liberalized before APRP began. Thus prices have been varying, as they should, mostly with supply and demand factors. APRP has probably had almost no effect on the price of paddy, despite its valuable contributions to saving water through SSVs and through its support for policy advocacy by the ACC.

- APRP did not target reforms at the producer prices of wheat or maize. The MVE Unit's concluding study on the wheat subsector found that farmers were now selling a significantly higher proportion of their production. It is not clear why this is the case. Numerous studies

under the project, including those of MVE, called for reforms in the wheat subsector that would allow wheat farmers to sell their product to any buyer (which they cannot do now). Such competition for their product might lead to higher prices.

- There are few or no presumed effects of APRP on the prices of any other major crops like maize or horticultural products, as there were almost no relevant benchmarks in these areas. If seed registration (and in the future, screening) benchmarks succeeded dramatically, one might expect varieties more desired by the market to be grown and possibly fetch farmers higher prices. No such significant change is apparent, however, although there was some progress in the area of reducing obstacles to the registration and importation of new varieties, particularly of vegetables.

Awareness of Reforms

The policy benchmarks implemented under APRP made water use rationalization a central theme in the policy reform process. The two crops for which this was particularly emphasized are rice and sugarcane. The rice program involved coordinated planting of short-season varieties, combined with shortening of the irrigation cycle. The sugarcane program introduced new irrigation technology, especially gated pipes and laser leveling.

Almost all the farmers surveyed in the rice-growing governorates were aware of the short-season rice varieties, and 85% have adopted them. The higher yield of these varieties, combined with their shorter cycle, constitute the major reasons why farmers are adopting them. Indeed, the observed increase in rice area during the summer season is a response of farmers to several factors, including the higher yields, attractive prices, and a liberalized market, in which producers get paid immediately and often sell at the farm gate.

94% of the farmers surveyed were aware of the new sugarcane irrigation systems; however, only 34% of this sub-population use them. 75% of the sampled farmers own the "network distributed over ground" system, while 25% of them operate the "portable network over ground" system. Besides saving water, 31% of the respondents associate the gains of using the improved systems with increased yield. The high cost of the project and the lack of subsidies constrains farmers from adopting these improved irrigation systems, for 10% and 90% of the respondents, respectively.

The introduction of acid delinted cotton seed was supported indirectly by APRP and promoted by CSPP. 83% of the sampled farmers in the cotton-growing governorates use delinted cotton seed. On average, 85% of the farmers agree that they received enough delinted cotton seed during the 2000/01 season. Those who did not receive enough delinted cotton seed believe that the total quantity available is not enough to cover all the needs. 68% of the respondents believe that the impact of delinted seed on cotton production is high.

Cotton price controls were partially liberalized during APCP, and a floor price system was set up during APRP. As part of the liberalization it was suggested that minimum export prices be only indicative, but this was not fully implemented. APRP also tried to institute a market information system that might have

increased farmers' bargaining power with buyers of their seed cotton. 77% of the farmers surveyed were aware of the floor price of cotton, but only 5% of them knew the export price.

Announcement of the floor price for seed cotton before planting time may be a new policy of MALR. This was not usually done, but in 2001 about 31% of the respondents had heard about the floor price before planting, versus 47% who heard about it after harvesting. Apparently a similar early announcement was made in 2002. While this shift in policy was not a direct effect of any policy benchmark under APRP, is is certainly consistent with the principles of APRP to provide all market participants with timely information for decision making.

1. INTRODUCTION

1.1 Background

At the end of 1950s and during the early 1960s, the Government of Egypt (GOE) was convinced that reliance on market mechanisms would induce economic growth. The state adopted the Lewis model of development, which postulates that forced saving and surplus labor can be extracted from the agricultural sector to promote industrial development. Along those lines, the GOE nationalized the major industries and the banking sector, and controlled agricultural production. The role of the private sector gradually shrank over the years. The expansion of state intervention was accompanied by various types of entitlements such as: input and food subsidies, and pension, health and education benefits. In order to finance these programs, explicit and implicit taxes were instituted, and price controls, overvalued exchange rates, tariffs and other indirect taxes, as well as public monopoly of the foreign trade were established. State intervention resulted in large distortions in the national economy and inefficient allocation of available resources.

By the early 1970s, Egypt began to experience severe economic disequilibria, leading to serious social and economical crises. These crises were manifest as internal and external financial imbalances such as deteriorating terms of trade, increasing balance of payment and budget deficits, and depletion of external reserves. The state faced this situation by foreign borrowing and by inflationary financing. As a consequence of this policy orientation, the standard of living dropped sharply, with a decline in the economic growth rate below that of the population, and there was deterioration of the basic infrastructure and public services. The government budget deficit reached 20 percent of GDP, and the growth rate in the agricultural sector fell to less than 2 percent per year.

To overcome these crises in the early 1990's Government adopted a structural adjustment (SA) program with the encouragement and support of the International Monetary Fund (IMF) and the World Bank (WB). This program was planned in collaboration with USAID. The principal objectives of the program included among others: reduction in the size of the public sector, elimination of price distortions in various sectors of the economy, and trade liberalization. The major policy instruments that were proposed in the program included: cuts in government spending on services, re-alignment of the exchange rate, privatization of government enterprises that did not function well, increased market reliance for the determination of the domestic prices of good and services, and external trade liberalization, with removal of all export and import controls.

In the agricultural sector, prior to the adjustment program, heavy implicit taxes were imposed by the Government through a pervasive system of control on farm production and input procurement and distribution. Crop rotations and land allocation decisions were entirely determined by the authorities. Compulsory delivery quotas at fixed prices were imposed on selected crops. Cotton and sugarcane were totally delivered to the Government; rice, wheat, fava beans, lentils, peanuts, and sesame were partially delivered to the government according to specific quotas for each crop. Prices were fixed for some non-quota crops and regulated for fruits and vegetables. Livestock products were sold in the free market. Agricultural inputs were distributed by the Government through PBDAC at subsidized prices but rationed to allocate the limited supply. Most agricultural exports and imports were under the control of the Government. This situation constrained tightly the farm sector and did not leave much freedom

to farmers to make resource allocation decisions. The policy to tax agriculture to promote industrial growth and provide cheap food for urban consumers was no longer a sustainable alternative; the Government decided in the late 1980s to reform the agricultural sector.

The overall policy reform program of the Government, relative to the agricultural sector, includes the following components: (1) removal of governmental control on farm input markets and acreage and procurement quotas; (2) farm output price increases to reflect their opportunity costs; (3) elimination of farm input subsidies; (4) removal of government restraints on the private sector regarding imports, exports and distribution of farm inputs as well as on farm production; (5) phase out gradually PBDAC from the distribution of agricultural inputs, confining its role to financing agricultural projects; (6) removal of barriers that impede the private sector's investments in agriculture; (7) confining the role of the MALR to research, extension, economic policies, and statistics, and (8) adjustment of the land tenancy system.

The application of the policy reform program has gone through different stages. Seven tranches of agricultural policy reforms (benchmarks) were carried out during the Agricultural Production and Credit Program (APCP) from 1987 to 1996. Over the period extending from 1986 through 1991 several reforms were implemented. Price controls on vegetables and fruits at the wholesale and retail levels were removed in 1986. During the period 1987-1989 the broad components of the program included: the removal of price and area constraints and delivery quotas on all crops except cotton, rice, and sugar cane; decontrolling meat and feed marketing including price increases, removal of imports constraints and feed subsidy; increasing slightly the prices of cotton, rice and sugar cane; opening citrus exports to the private sector; reducing fertilizer subsidies through a 75-percent price increase; limiting state ownership of land. These steps were carried out in 3 tranches. The 1990-1992 phase had the following reforms implemented: increasing the farm gate price of cotton to 66 percent of the world price; eliminating the control and regulation on rice marketing in 1991/92; removing farm input subsidies except for potassium fertilizers and cotton pesticides. The private sector was allowed to market and import fertilizers freely. Energy and farm machinery continued to be subsidized although their prices have increased. Agricultural credit was confined to cash loans, and the subsidy on interest rates was decreased to LE 105 million. During the period 1993-1996, the reforms introduced included: liberalization of the cotton market; removing constraints on foreign trade of sugar, red meat, poultry and other food commodities. There were some attempts to analyze the impact of APCP (Fletcher, 1996) however, no reliable farm level income data were available to support this. The baseline section in this report will discuss new sources of information available for the evaluation of the welfare impact of policy reforms at the farm level.

Following APCP, the Agricultural Policy Reform Program (APRP) was initiated. This program included five tranches and many benchmarks and indicators. The first benchmarks were due to be accomplished by June 1997 and the last, by December 2001. There are five ministries involved in the program namely: Agriculture and Land Reclamation, Water Resources and Irrigation, Supply and Home Trade, Economy and Foreign trade, and Public Enterprises. Other ministries have occasionally cooperated with the program.

The goals of APRP fall in the following categories: (1) Prices, Markets and Trade (PMT); (2) Private Investment and Privatization in Agribusiness (PIPA); (3) Agricultural Land and Water Resource Investments, Utilization and Sustainability (ALWRIUS); (4) Agricultural Sector Support Services (ASSS); (5) Food Security and Poverty Alleviation (FSPA).

Table 1: APRP Policy Reform Goal Categories and Key Benchmarks Expected to Have Impact at the Farm Level

Goal Categories	Key Policy Benchmarks
Agricultural Sector Support Services	Horticultural Exports Market Information New role for extension
Agricultural Land and Water Resource Investments, Utilization and Sustainability	Liberalize Cropping Patterns Matching Irrigation Supply and Demand Land and Water Plans (matching) Optimal Use of Water: Short Season Rice Varieties Optimal Use of Water: New Sugarcane Irrigation Systems
Prices, Markets and Trades	Freedom to Market Cotton Liberalize Fertilizer Distribution Liberalize Rice Market
Private Investment and Privatization in Agribusiness	Privatize and Promote Cotton Sector (ginning, spinning) Privatization of rice mills Privatize Cotton Pest Control

1.2 Objectives

The goal of this study is to examine the impacts of APRP at the farm level. The effects of APRP are studied through some quantitative as well as qualitative performance indicators. The specific objective is to determine to what extent policy changes have influenced activities at the farm level.

1.3 Overall Approach

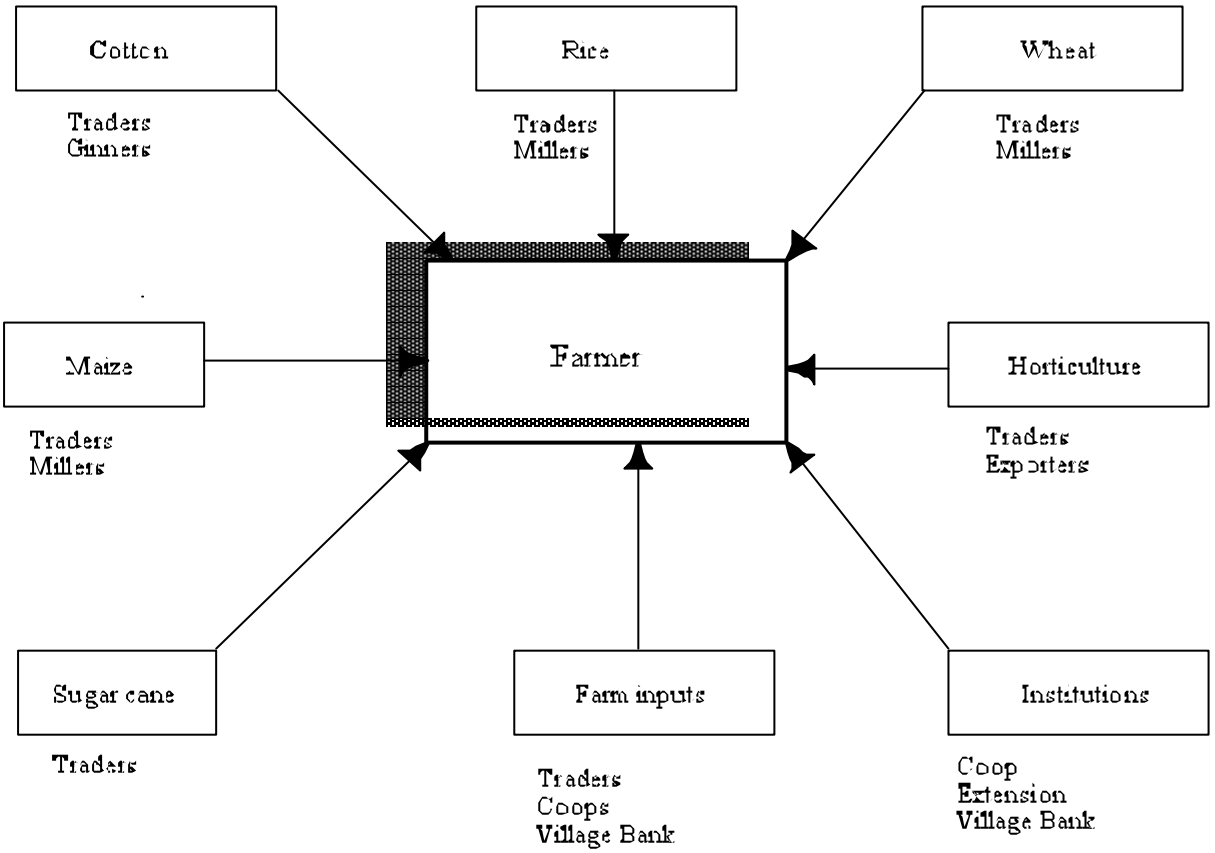
The central issue of this study is to assess the impacts of APRP on the agricultural system in general and on farmers in particular, by comparing the periods before and after the program through performance indicators. To achieve this objective, three data collection procedures will be implemented:

- A formal farm survey centered on farmers in the major agricultural zones ("MVE endline producer survey, 2001");
- A complementary survey with focus on the main institutions dealing with farmers;
- The use of secondary databases primarily aimed at establishing a baseline strategy.

The questions asked in the surveys were focused on APRP policy reforms. The quantitative as well as the qualitative aspects of these policy reforms were be investigated. The overall policy reform goal categories and the major policy benchmarks are summarized in Table 1.

The respondents to the producer survey and the complementary survey components and interactions are shown in Figure 1.

Figure 1: Respondents to the Producer and Complementary Impact Assessment Surveys



The questions on the producer survey are divided into five major categories: (1) production of crops; (2) farm input markets; (3) farm output markets; (4) farmers' opinions about policy reform impacts and (5) the institutions and organizations involved. Table 2 summarizes these different areas of interest and their corresponding performance indicators.

The complementary survey was designed to bring together farmers' opinions or facts regarding policy changes and the perceptions of the other actors in the agribusiness community on the same questions. This innovation allows us to follow the links and highlight the major points of agreement and disagreement between farmers and the other major participants in the agricultural system. We believe that this two-sided vision provides us with a more complete picture of APRP's impact. The text table below summarizes the different areas and their corresponding targeted populations.

Table 2: Performance Indicators and Other Key Descriptors

Areas	Indicators
Production	Farm size Land holding Cropping patterns Cropping intensities Crop and animal disposal Cost of production Crop yield Farm assets Farm income
Input Market	Fertilizers suppliers' market shares Seed suppliers' market shares Pesticide suppliers' market shares Level of input Prices
Output Market	Output marketed Value of sales Dealers' shares Level of output prices
Opinions	Farmers' awareness of APRP Who decides the cropping pattern Input market preferences Output market preferences Information sources

Complementary Survey Sectors and Targeted Populations

Areas	Populations
Cotton	Traders, Ginners, Spinners
Rice	Traders, Millers
Wheat	Traders, Millers
Sugarcane	Traders, Sugar Council
Maize	Traders, Millers
Horticulture	Traders, Unions, Exporters
Farm inputs	Traders, Cooperatives, Village Bank
Institutions	Cooperatives, Extension, Village Bank

2. METHODOLOGY AND IMPLEMENTATION

2.1 Methodology

A proposed approach, namely structured formal interviews with an appropriate sample of producers, was considered. In this approach producers were to be sampled from those in the main producing governorates for the crops in question. An appropriate sampling design has to be developed by governorate, district, village, and farms. This approach has the following advantages: 1) it provides the MVE unit with additional information, since these interviews are conducted largely using a questionnaire but allow for additional questions too, and 2) most of the required information and data are to be collected during the field work, which assists in producing a detailed report about the impact of the APRP on the farm level.

An important consideration that can inform the choice of information gathering technique is the size of the sample frame, and the relative homogeneity or heterogeneity of farms in that frame. This field survey included preparing a list of questions to collect the required data, and also designing the appropriate sampling technique. The appropriate sample size was determined (as it will be explained later) and the list frame methodology was followed, by using all of the available information about the sample units in the MALR, and farmers were chosen. Simultaneously, a sub-sample was selected from different sizes of holding to address their attitude towards the APRP.

2.2 Survey Implementation

The implementation of the survey included the following steps:

- Identify the objectives of the survey and determine the studied population.
- Develop the appropriate sampling technique and determine the sample size.
- Design the questionnaires (for producers and complementary questionnaire).
- Selecting the researchers (or the interviewers).
- Implementing a short training course for the interviewers.
- Pre-testing the proposed questionnaires and making decisions.
- Selecting the sampled governorates, districts, villages, and farmers.
- Setting up the timetable for conducting the survey process (depending on the estimates obtained from the
- Conducting the selected interviews.
- Receiving, reviewing and editing the entire questionnaires.
- Cleaning and entering the data into computer files.
- Analyzing the information and data collected using SPSS.

The following section includes a detailed discussion for some of the major factors.

2.3 Designing Sampling Technique

The proposed sampling procedure has been designed so that the sampled farmers represent the whole studied population. This has been done through designing a sampling technique, which allowed the selected sample, via applying stratifications and clustering the studied population, to represent to a great extent the examined population. The designed sample was drawn from a multiple frame. Since the survey is supposed to provide the needed information for the impact assessment of the APRP on the farm level, the producer questionnaire included various questions about cropping pattern, major crops

trading and marketing, inputs marketing and its preferred sources for producers, and awareness of farmers with the major issues of the agricultural policy reform program.

The designed sampling technique is very close to what is called a stratified multi-stage cluster random sampling. Therefore, the sampling procedure included stratifying the governorates according to the dominant cropping pattern, different geographical locations, and some special issues such as sugarcane improved irrigation technique and extension and research coordination to increase the exports of horticulture crops. The first stage of the proposed multi-stage sampling procedure is to select from each stratum a representative sample of the governorates, which grow major field crops, where the primary sample unit is each governorate. However, ten governorates are selected; namely, Beheira, Kafr El Seikh, Sharqeya, Daqahleya, Gharbeya, Beni Suef, Minya, and Assiut, and Qena. The second stage is to select districts from each selected governorate, thirty-one districts are selected. The third stage is choosing villages within each selected district, where sixty-two villages are included in the sample. The fourth stage includes selecting farmers to be interviewed. In addition to the stratification by cropping pattern and geographical areas, another sort of stratification has been carried out, where farmers in each selected village were classified into different size of holding groups in order to reflect the response of these groups towards the issues under study. Taken into consideration the results of the latest Agricultural Census (1990), five groups of different size of holding were specified (less than 1, 1-3, 3-5, 5-10, 10 and more feddans).

2.4 Sample Size Determination

With respect to sample size determination, two main constraints were taken into account when studying this issue. These two constraints are time availability for getting the main findings of the survey needed and limitation of the budget assigned to this task. After examining all of the affecting factors, the total sample size was set at 745 farms. While this size does not make it nationally representative sample, it is large enough to indicate whether the effects of the policy reforms called for in the benchmarks were seen at the producer level. Note, also, that the producer survey is not the primary form of assess the impact of the APRP, eg, rice marketing and fertilizer distribution. For these issues, however, the producer survey is a valuable source of complementary and supplementary information (Table 3).

2.5 Selecting Interviewers

After deciding about the methodology to be followed to implement the endline producer survey, the MVE unit arranged to conduct the interviews with the assistance of selected local experts, who were called associate researchers and chosen after interviewing many candidates. The main criteria for selection were: (a) having practical experience in similar activities, (i) being unbiased researchers and not affiliated to any of the implementing organizations, and (iii) having the ability to write a comprehensive report about the studied issues in the selected governorate. An orientation session and short training course was held to help in carrying out such a survey. The main topics of the training course were: (a) the survey objectives, (i) the proposed questionnaires, (iii) possible additional questions, and (iv) expected main components of the final report.

2.6 Timetable of the Survey

The survey was started in the second half of October 2001. The reason for that is to ensure that all of the farmers who grew cotton and rice had already harvested it; hence, for example, questions concerning the comparison between the current cotton season and last year's, for the same farmer, could be precisely answered. The data collection process has been completed before the beginning of Ramadan in the mid of November 2001

2.7 Interview Procedures and Data Recording

A list of key questions related to the studied issues, in the form of a questionnaire, were prepared by the MVE unit for use in the interviews. The associate researchers did not use this list the way it works in a classical survey, but instead these listed questions were posed to the farmer in an appropriate way to: (a) give the farmer the chance to add more information about the related issues, (ii) give the interviewer an opportunity to develop additional questions and take notes as needed, and (iii) allow the interviewer to record the quantitative data in the questionnaire for each interviewed farmer.

Table 3: Sample Distribution

Governorate	District	Village	Less than 1 Feddan	1-3 Feddans	3-5 Feddans	5-10 Feddans	10 Fed. or more	Total
Sharqeya	Zagazik	Berden	3	4	3	2	-	12
		Ben Amer	2	3	3	2	2	12
	Dearb Negim	Saft Zerek	4	4	3	1	-	12
		El-Hawaber	3	4	3	2	-	12
	Fakous	Kafr Shawesh	2	3	3	2	2	12
		El-Deman	2	3	2	3	2	12
	Menya El-Kamh	El-Sadeen	2	4	2	2	2	12
		Meet Sohal	2	3	2	2	2	12
	Total		**20**	**28**	**22**	**16**	**10**	**96**
Daqahleya	Talkha	Bahout	3	3	2	2	2	12
		Meet El-Karama	3	3	2	2	2	12
	El-Senbelaween	Meet Ghereta	3	3	2	2	2	12
		Tamay El-Zahayra	3	3	2	2	2	12
	Belkas	El-Damayra	3	3	2	2	2	12
		Menshet Abd El-Kader	3	3	2	2	2	12
	Dekerness	Kafr Abo Nasser	3	3	2	2	2	12
		Meet Romy	3	2	3	2	2	12
	Total		**24**	**23**	**17**	**16**	**16**	**96**
Kafr El Sheikh	El-Hamol	El-Menawfa	2	3	2	3	2	12
		Koom El-Dahab	-	2	4	4	2	12
	Kafr El-Sheikh	Messer	3	3	2	2	2	12
		Shnoo	3	3	2	2	2	12
	Desouk	Mehlat Dyay	3	3	2	2	2	12
		Shabas El-Malh	3	3	2	2	2	12
	Total		**14**	**17**	**14**	**15**	**12**	**72**

Governorate	District	Village	Less than 1 Feddan	1-3 Feddans	3-5 Feddans	5-10 Feddans	10 Fed. or more	Total
Beheira	El-Delengate	Abo Masoud	4	4	2	1	1	12
		Menshet Meet Ghamer	2	2	3	3	2	12
	El-Rahmania	El-Kahwageya	3	3	2	2	2	12
		Ezbet El-Maged	4	4	4	-	-	12
	Abou Homes	Sahaly	2	4	2	2	2	12
		Mehalet Keel	4	4	2	2	-	12
	Damanhour	Ndebeh	1	5	2	2	2	12
		Manshet Hamour	1	5	1	4	1	12
	Total		**21**	**31**	**18**	**16**	**10**	**96**
Ismaileya	Ismaelia	El-Manayef	2	2	3	2	3	12
		El-Sabaa Abar	2	3	2	3	2	12
	El-Kantra Gharb	El-Radah	3	3	3	2	1	12
		El-Nasser	2	2	3	2	3	12
	Total		**9**	**10**	**11**	**9**	**9**	**48**
Gharbeya	Tanta	Kafr El-Mansour	2	3	2	2	3	12
		Berma	3	2	2	3	2	12
	Zefta	Meet El-Mokhles	2	3	4	2	1	12
		Minyat El-Mobashreen	3	3	3	3	-	12
	El-Santa	Kafr Khazael	2	3	2	2	2	12
		El-Moshaee El-Kobra	2	3	4	3	-	12
	Total		**14**	**17**	**17**	**15**	**8**	**71**
Beni Suef	El-Wasta	Abo Seer El-Malk	3	3	2	2	2	12
		Kamn El-Aroos	3	3	2	2	2	12
	Ahnasia	Kay	2	3	3	2	2	12
		El-Awanya	2	4	2	2	2	12
	El-Fashn	El-Fant	2	4	2	2	2	12
		Kafer Darwesh	3	5	2	-	2	12
	Total		**15**	**22**	**13**	**10**	**12**	**72**

Governorate	District	Village	Less than 1 Feddan	1-3 Feddans	3-5 Feddans	5-10 Feddans	10 Fed. or more	Total
Minya	Beny Mazar	El-Saeedia	3	3	2	2	2	12
		Shekh Ataa	3	3	2	2	2	12
	Samalot	Der Samalot	3	3	2	2	2	12
		Shekh Abdalaa	2	3	2	3	2	12
	Abo Qurkas	Kom El-Mahros	3	2	3	3	2	13
		Kom El-Zoher	3	1	2	3	3	12
	Total		**17**	**15**	**13**	**15**	**13**	**73**
Assiut	Abnob	El-Hamam	3	3	2	2	2	12
		Bani Mohamed	3	3	2	2	2	12
	Assiut	Mosha	3	3	2	2	2	12
		Naga El-Sabaa	3	3	2	2	2	12
	Dairot	Kodiet El-Islam	3	3	2	2	2	12
		Shnabou	3	3	2	2	2	12
	Total		**18**	**18**	**12**	**12**	**12**	**72**
Qena	Luxour	El-Karana	-	6	3	2	2	13
		El-Karnak	-	5	4	3	-	12
	Esna	El-Nasma	-	2	1	4	2	9
		El-Shaghab	3	4	2	3	3	15
	Total		**3**	**17**	**10**	**12**	**7**	**49**
Grand Total			**155**	**198**	**147**	**136**	**109**	**745**

3. GENERAL FEATURES OF THE SAMPLED FARMS

3.1 Land Tenure

Table 4 shows the distribution of owners and tenants by governorate in 2000/01. The distribution of number of farmers who completely own their own farms ranged from about 76% in Gharbeya to about 92% and 94% in Kafr El-Sheikh and Ismaileya, with an overall average of about 81% for the total sampled farmers. Table 4 also indicates that pure tenant farmers are concentrated in Beni Suef, Qena and Beheira, and they are all in the small farmer group. The data also show that most of the farmers in the sample who are both tenants and owners of their operated farms; i.e., those who only own part of their farm and rented the other part, are concentrated in Beheira, Gharbeya, Assiut and Qena, with about 33%,16%,14%, and 12%; respectively (Table 4).

Table 5 shows the distribution of the sampled farmers by size of holding and by governorate as it has been obtained from the survey. It indicates that about 47 % of the sampled farmers operate farms less than three feddans, 20% operate farms of three to five feddans, and about 33 % operate farms of more than five feddans (Tables 5).

3.2 Cropping Pattern

Tables 6 shows the distribution of crops planted by farmers in different seasons. Data show that with respect to the main winter crops, which were found to be wheat, long berseem, short berseem, and fava beans crops. It should be noticed that the total of crop planting is greater than the total number of interviewed farmers in each governorate. The total planting allows for calculation of percentages that show the relative importance of each crop within the winter and summer seasons, percentage of farmers who grew these crops were about 37%, 33%, 15%, 10% of the total planting sampled farmers who cultivated winter crops in the agricultural year 2000/2001; respectively.

On the other hand, with respect to the main summer crops, which were found to be cotton, rice, maize, and sorghum, the proportion of the sampled farmers who grew these crops in 2000/2001(Table 6) were found to be about 26%, 27%, 35%, and 4%; respectively.

3.3 Application of the New Law of Tenants of Agricultural Land

It was noticed during the implementation of the base line survey that many farmers were worried about the application of the new law of "the relationship between tenants and owners of agricultural land" in October 1997 (at the beginning of the new agricultural year 1997/98). There were two different perspectives when farmers discussed this issue, depending on their position as tenants or owners. The tenants complained that the application of this law would leave them and their families without any source of finance for living, especially since most of those tenants have extended families. Tenants were expecting to be working as hired labors for low wages per day since the supply of labor would be increased. They claimed that this law would affect negatively the relationships between farmers and may

Table 4: Distribution of Farmers by Type of Holding, by Governorate

(percent)

Ownership/Governorate	Sharqeya	Daqahleya	Gharbeya	Beheira	Kafr El Sheikh	Ismaileya	Beni Suef	Minya	Assiut	Qena	Total
Pure Owned	85	90	76	54	92	94	81	81	85	78	**81**
Pure Rented	2	1	3	7	3	4	11	1	1	10	**4**
Owned+Rented in, cash	6	3	15	33	4	2	4	10	14	12	**11**
Owned+Rented in, in kind	0	0	0	1	1	0	0	0	0	0	**0**
Owned+Rented out, cash	1	5	6	1	0	0	4	8	0	0	**3**
Owned+Rented out, in kind	5	1	0	3	0	0	0	0	0	0	**1**
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Table 5: Distribution of Farmers by Farm Size, by Governorate

(percent)

Size of Holding/Governorate	Sharqeya	Daqahleya	Gharbeya	Beheira	Kafr El Sheikh	Ismaileya	Beni Suef	Minya	Assiut	Qena	Total
< 1 Feddan	21	25	20	22	19	19	21	23	25	6	**21**
1 to 3 Feddans	29	24	24	32	24	21	31	21	25	35	**27**
3 to 5 Feddans	23	18	24	19	19	23	18	18	17	20	**20**
5 to 10 Feddans	17	17	21	17	21	19	14	21	17	24	**18**
10 Feddans and over	10	17	11	10	17	19	17	18	17	14	**15**
Total	100	100	100	100	100	100	100	100	100	100	100

Table 6: Distribution of Farmers and Planted Area for Major Crops, 2000-01

(percent)

Season	Crop	No. of Farmers	Area Planted
Winter	**Wheat**	37	41
	Long Berseem	33	26
	Short Berseem	16	17
	Fava Beans	11	11
	Sugar Beets	4	6
	Total	**100**	**100**
Summer	**Rice**	27	35
	Maize	35	30
	Cotton	26	26
	Sorghum	4	3
	Watermelon (Lip)	3	3
	Drawa	3	1
	Soybeans	2	1
	Total	**100**	**100**
Perennial	**Sugarcane**	39	36
	Mangoes	19	24
	Grapes	18	16
	Oranges	7	12
	Mandarins	3	4
	Apples	5	3
	Bananas	5	3
	Aromatics	4	2
	Total	**100**	**100**
Other Crops		9	6
	TOTAL	**100**	**100**

lead to a confrontation between both sides. Tenants rejected the idea of owning newly reclaimed land because they want to live in the same villages with their families.

On the other hand, owners of land reported that these lands are their lands and it is their right to have them back. Owners also believed that having their land back would benefit the agricultural sector and hence the Egyptian economy. Owners reported their expectations that free land market (which means more appropriate rents and more freedom to change management and resource use) should lead to new cropping pattern better reflecting profitability of different crops. Demand from processing industries would be one determinant of profitability, through output price. Owners also anticipated that changing the holding structure in agricultural land within some regions would lead the new producers to save more and have higher investment in agribusiness industries, which are also more capital intensive in its activities, and hence the trend of the cropping pattern will be changed toward growing more cash crops to compensate all items of costs including capital use' cost. They will also be able to apply modern techniques in agricultural production, especially mechanization and new post harvest methods (grading, packing, etc), and get the advantages of the economies of scale, in their attempt to increase the

Table 7: Distribution of Number of Farmers and Area Planted of Main Crop Rotations

(percent)

Crop Rotation	No. of Farmers	Area Planted
Wheat + Maize	18.5	18.5
Short Berseem + Cotton	15.6	17.1
Wheat + Rice	11.7	15.1
Long Berseem + Maize	13.2	10.4
Long Berseem + Rice	11.2	9.7
Sugar Beets + Rice	1.7	3.7
Fava Beans + Cotton	2.8	3.2
Wheat + Cotton	2.3	1.8
Potatoes + Rice	0.6	1.7
Wheat + Sorghum	1.2	1.4
Potatoes + Maize	0.5	1
Other	20.7	15.6
Total	100	100

Source: MVE endline producer survey, 2001.

4. IMPACTS OF APRP

4.1 Cropping Patterns

One of the early goals in the policy reform process was the elimination of the mandatory cropping patterns, when not dictated by technical constraints. This section will examine the impact of policy changes on farmers' freedom to choose their cropping patterns. A special focus will be put on the reasons why farmers' alter their crop mix.

4.1.1 Freedom to Choose Cropping Patterns

Can we say today that farmers are free to choose their cropping patterns. Table 8 shows farmers' opinions about their freedom to choose the cropping patterns in the ten (10) surveyed governorates. More than 97% of the sampled farmers believe they are free to choose the cropping patterns. Only Ismaileya and Kafr El Sheikh show rates below 90%. These two governorates are more specialized in horticultural crops.

Table 8: Freedom to Choose Cropping Patterns

	No		Yes	
	Number of Farmers	**Percent**	**Number of Farmers**	**Percent**
Sharqeya			96	100
Daqahleya	2	2	94	98
Kafr El Sheikh	16	22	56	78
Beheira			96	100
Ismaileya	6	13	42	87
Gharbeya			72	100
Beni Suef			72	100
Minya			73	100
Assiut			72	100
Qena			49	100
Total	**24**	**3**	**722**	**97**

Source: APRP/MVE Endline Producer Survey, November 2001.

Although farmers feel strongly that they are free to choose the cropping patterns, they do not do it unilaterally. Table 9 highlights that for about 76% of the sampled farmers, cropping patterns are determined by consulting with other farmers, with neighbors or with family members. Extension agents play a modest role in choosing the cropping patterns.

Table 9: Consulting Others When Choosing Cropping Patterns

	No. of Farmers	Percent
Neighbors [1]	223	31
Other Farmers	293	41
Family	31	4
Extension Agent	68	9
Others	107	15
Total	722	100

Source: APRP/MVE Endline Producer Survey, November 2001.
[1] Neighbors are farmers sharing the same block of land.

In the overwhelming majority of cases as shown above, farmers are free to choose their cropping patterns. Do they effectively exercise this new right? Table 10 reveals that overall, 57% of the interviewed farmers did not change their cropping patterns during the 2000/01 season compared to 1997/98. However, this behavior is not uniform among all governorates: In Sharqeya, Daqahleya and Assiut, farmers did change their cropping patterns compared to 1997/98. Informal discussions with farmers suggest that technical constraints related to the crop rotations are largely associated with the lack of changes in the cropping patterns.

Table 10: Changes in Cropping Patterns Compared to 1997/98

	No		Yes	
	Number of Farmers	Percent	Number of Farmers	Percent
Sharqeya	39	41	57	59
Daqahleya	6	6	88	94
Kafr El Sheikh	29	52	27	48
Beheira	83	86	13	14
Ismaileya	30	71	12	29
Gharbeya	49	68	23	32
Beni Suef	60	83	12	17
Minya	39	53	34	47
Assiut	31	43	41	57
Qena	48	98	1	2
Total	**414**	**57**	**308**	**43**

Source: APRP/MVE Endline Producer Survey, November 2001.

4.1.2 Factors Affecting Cropping Patterns

Technical constraints may dictate cropping patterns, but farmers may have other reasons for their choices. In this section, we examine the reasons that farmers take into account when deciding the cropping patterns. For cotton, rice, wheat and maize, Table 11 shows the reasons why farmers alter their cropping patterns. Regarding cotton, crop profitability dominates all the other factors, with 62% of the responses; it is followed by crop rotation as the second reason. For rice, the combination of auto consumption, crop profitability and better market opportunities is the predominant category for changing the cropping patterns for 21% of the respondents. Crop profitability in association with home consumption took the second place in explaining why farmers changed their cropping patterns. Regarding wheat, the dominant factor explaining farmers' desires to change their cropping patterns is crop profitability. The next contributing factors are crop rotation and home consumption. Concerning maize, the most common factor explaining farmers' reasons to change their cropping patterns is crop profitability, with 18% of the respondents in that category. The next contributing factor is home consumption in association with animal feeding.

Table 11: Reasons for Changing Cropping Patterns, Major Crops

Reasons	Percent			
	Cotton	**Rice**	**Wheat**	**Maize**
Crop Rotation	11	5	10	9
Crop Profitability	62	7	11	18
Consumption		4	9	5
Animal Feeding				4
Marketing Constraints	2	6	2	
Plant Diseases	2	1	1	1
Water Shortage		5		
Crop Rotation + Crop Profitability	5	3	1	6
Crop Rotation + Shortage of water	2			
Crop Rotation + Market Constraints			2	
Crop Rotation + Auto Consumption		1	5	3
Crop Rotation+Market Constraints			2	
Crop Rotation+Animal Feeding			1	2
Crop Profit + Market Constraints			1	
Consumption + Profitability		17	7	
Consumption+Animal Feeding				10
Market Constraints + Disease	7			
Consumption+Profitability+Market Constraints		21		
Others	9	30	48	42
Total	**100**	**100**	**100**	**100**

Source: APRP/MVE Endline Producer Survey, November 2001.

For sugarcane, sugarbeet and the horticultural crops, Table 12 shows the reasons why farmers change their cropping patterns. For these crops, profitability is the dominant factor explaining farmers' need to change the cropping patterns, for respectively 100%, 88% and 64% of the respondents. For fodder, animal feeding and crop rotation are the dominant explanatory factors associated with farmers' reasons to change the cropping patterns, with 30% and 27% of the respondents in those categories respectively. In light of these answers for the whole section, the category crop profitability within crop rotations and other associations including it are by far the leading factors explaining why farmers are changing their cropping patterns.

Table 12: Reasons for Changing Cropping Patterns, Other Crops

Reason	Percent			
	Sugarcane	**Sugarbeet**	**Horticulture**	**Fodder**
Crop Rotation		3	2	27
Crop Profitability	100	88	64	8
Consumption				
Animal Feeding			2	30
Marketing Constraints		2	18	8
Plant Diseases			4	
Crop Rotation + Crop Profitability			2	2
Crop Rotation+Market Constraints				3
Crop Rotation+Animal Feeding				5
Profitability + Market Constraints		7	4	4
Consumption + Profitability			2	
Market Constrains + Disease				1
Others			2	12
Total	**100**	**100**	**100**	**100**

Source: APRP/MVE Endline Producer Survey, November 2001.

4.1.3 Impact of Policy Reforms on Cropping Patterns

This section will look at the timing of the policy reform process regarding farmers' freedom to choose the cropping patterns. Table 13 indicates that more than 56% of the farmers started exercising the freedom to choose their cropping patterns between 1996 and 1999; this period corresponds to the period of APRP. Between 1986 and 1995, corresponding to the APCP policy reform period, a cumulative 36% of the sampled farmers started choosing their cropping pattern. Prior to 1986, only 8% of farmers felt they were free to choose the cropping pattern. Since there were no new cropping pattern-related reforms under APRP, it appears there was a lagged impact of policy reform on farmers, similar to the diffusion process of a new technology. The momentum continued of policy reform during APRP may have contributed, however, to farmers' perception about their ability to choose their cropping patterns.

Table 13: Starting Dates for Choosing Cropping Patterns

Dates	Number of Farmers	Percent
Before 1990	55	7.6
1990	20	2.8
1991	1	0.2
1992	40	5.5
1993	76	10.5
1994	40	5.5
1995	89	12.3
1996	205	28.4
1997	157	21.8
1998	36	5
1999	3	0.4
Total	**722**	**100**

Source: APRP/MVE Endline Producer Survey, November 2001.

The qualitative appreciations of the interviewed farmers regarding the trend in cultivated area for the major field crops are shown in Table 14, compared to 1997/98. Regarding cotton, the trend in cultivated area is decreasing according to 73% of the respondents. Concerning rice, 81% of the interviewed farmers think that overall, the trend in rice area is increasing. For wheat, results show that overall, 74% of the interviewed farmers think that the trend in wheat area is increasing. For maize, 66% of the interviewed farmers believe that the trend in maize area is increasing. Sugarcane and sugarbeet are both overwhelming gaining popularity among farmers. Respectively, 100% and 98% of interviewed farmers in these areas believe that the trend in area for these two crops is increasing. For the horticultural crops, results show that 60% of the interviewed farmers support an increasing trend in area.

Table 14: Opinions About Trends in Cultivated Area Compared to 1997/98

Crops	Direction of Change (%)		
	No Change	Increase	Decrease
Cotton	1	26	73
Rice	0	81	19
Wheat	6	74	20
Maize	3	66	31
Sugarcane	0	100	0
Sugarbeet	0	98	2
Horticulture	0	60	40
Fodder	0	56	44
Total	**1**	**26**	**73**

Source: MVE Endline Producer Survey, November 2001.

Table 15 shows the area cultivated by surveyed farmers for the major crops, during the 1996/97 season (Producer Survey) and the 2000/01 season. For the winter season, the cropped area decreased by 3% for wheat, 5% for fava beans, 1% for short berseem and increased by 5% for long berseem. For the summer season, the cropped area decreased by 12% for cotton and, 5% for maize, and increased by 10% for rice. In terms of land allocation, cotton is losing popularity among farmers to the benefit of rice in the summer season. The growing adoption of the short season rice varieties promoted by APRP not only reduces the water needs but improves rice yield. Partial liberalization of seed cotton marketing compared with more or less full liberalization of paddy marketing also made rice a more attractive option.

Table 15: Shares of Area Cultivated to Major Crops

(percent)

Winter Crops			Summer Crops		
Crops	Seasons		Crops	Seasons	
	1996/97	2000/01		1996/97	2000/01
Wheat	40	37	Cotton	39	28
Fava bean	16	11	Rice	25	34
Long Berseem	17	22	Maize	29	24
Short Berseem	18	17	Sorghum	4	3
Others	9	13	Others	3	11
TOTAL	100	100	TOTAL	100	100

Source: MVE Endline Producer Survey, November 2001.

4.2 Input Markets

Policy reforms under and prior to APRP put a strong emphasis on the liberalization of input markets, with a greater participation of the private sector. For fertilizer, despite the reversal during 1995-96 "crisis", the private sector share of fertilizer distribution was building up over the years. Recent policy changes during the 2001/02 season may again reverse the trend. This section will examine questions relative to the liberalization of input markets, as viewed during the 2000/01 cropping season, including farmers' freedom to acquire farm inputs.

4.2.1 Freedom to Buy Inputs

Tables 16 highlights farmers' opinions about their freedom to buy farm inputs from any source. In the case of wheat, maize and rice, farmers are totally free to buy their seeds. Cotton is the only crop for which the majority of farmers (73%) feel they are not free to choose their seed dealers. This is because the GOE closely controls the production and sale of cotton seed, and farmers can buy seed only from any supplier.

Table 16: Percentage of Farmers Who are Free to Buy Inputs, by Crop Grown

(percent)

Farm Inputs	Cotton		Wheat		Maize		Rice	
	No	Yes	No	Yes	No	Yes	No	Yes
Seeds	73	27	0	100	0	100	1	99
Fertilizers	2	98	0	100	0	100	0	100
Pesticides	5	95	0	100	0	100	0	100

Source: APRP/MVE Endline Producer Survey, November 2001.

Farmers' perception of their freedom to buy fertilizer from different suppliers reveals that, in the case of cotton, wheat, maize and rice, farmers are virtually free to buy fertilizer. In the case of pesticides, for wheat, maize, rice and sugarcane, all farmers felt they are free to buy them from any suppliers. For cotton, 95% of the farmers' said they had the freedom to choose their pesticide suppliers (95%). Under the GOE carried out a major reform in this area. MALR withdrew from the position of cotton pest control services and agreed to let cooperatives and private agents provide pesticides and related services. MALR will maintain its role in regulating pesticide registration, sale, and use to ensure safety and protect the environment.

The overall results emphasize that in general, farmers enjoy a high degree of freedom to choose their input suppliers.

4.2.2 Best Sources of Inputs

Table 17 illustrates farmers' views about their best sources of seeds for cotton, wheat, maize and rice. In the case of cotton, the cooperatives are the best source of seeds for farmers in 83% of the cases. In the case of wheat, maize, and rice the cooperatives are the best source of seeds followed by the traders. Overall, the cooperatives are the most important seed suppliers for all the major field crops considered, followed by the private traders.

Table 17: Best Sources of Seeds, Major Crops

(percent)

Supplier	Cotton	Wheat	Maize	Rice
PBDAC	1.8	1.4	1.6	1.9
Cooperatives	83.4	62.1	60.6	52.8
Traders	4.5	26.2	27.1	34.5
Own	0.3	1.2	1.4	1.4
Central Agent	1.2	0.6	0.6	0.9
Others	8.8	8.5	8.7	8.5
Total	100.0	100.0	100.0	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Table 18 contains farmers' opinions about their best sources of fertilizer for cotton, wheat, maize and rice. The private traders and the cooperatives lead the fertilizer market in terms of popularity. Between these two categories, the private traders are the predominant fertilizer suppliers for the major field crops except cotton. APRP focused its fertilizer reforms on ensuring that the private traders were free to distribute fertilizer. This was partly responsible for the opportunity they had to increase their popularity with farmers.

Table 18: Best Sources of Fertilizer for Growers of Major Crops

(percent)

Supplier	Cotton	Wheat	Maize	Rice
PBDAC	1.2	1.1	0.7	1.4
Cooperatives	52.2	42.8	33.6	37.5
Traders	33.4	44.3	41.6	51.9
Others	13.2	11.8	24.1	9.2
Total	100	100	100	100

Source: APRP/MVE Endline Producer Survey, November 2001.

Table 19 conveys farmers' views about their best sources of pesticides for cotton, wheat, maize and rice. Regarding cotton, the cooperatives and the traders are the best source of pesticides in respectively 68% and 22% of the cases. In the case of wheat, maize, and rice the traders are the best source of pesticides in about 50% of the cases, followed by the cooperatives about one-third of cases. The private traders and the cooperatives dominate the pesticide market. For all major field crops except cotton, the traders are the most preferred pesticide suppliers. MALR had strong control over cotton pest control before and during most of APRP. By the end of APRP, MALR allowed private traders and service providers to take part in all aspects of cotton pest control, but the effects of this significant change in policy are not yet evident in these data.

Table 19: Best Sources of Pesticides for Growers of Major Crops

(percent)

Supplier	Cotton	Wheat	Maize	Rice
PBDAC	0.9	0.6	0.3	0.7
Cooperatives	67.5	36.9	35.5	34.3
Traders	21.9	50.4	51.6	53.9
Others	9.7	12.1	12.6	11.1
Total	100	100	100	100

Source: APRP/MVE Endline Producer Survey, November 2001.

The overall results reveal that in general, farmers choose the traders as their preferred source of inputs because of the availability of the products and their better facilities. They also choose to buy their inputs from the cooperatives because of their higher quality. Seed supplies are predominantly distributed by the cooperatives. Cotton inputs are largely controlled by the cooperatives, while the private traders dominates the supplies of inputs for wheat, maize and rice.

4.2.3 Impact of the Policy Reforms on the Input Markets

Table 20 shows the shares for different suppliers of fertilizer of the total quantity purchased. Overall, the private suppliers and the cooperatives control more than 95% of the total supply of fertilizer. These results shows ample evidence that through the 2000/01 season, the private sector was markedly involved in fertilizer marketing, which supports the notion that there was fertilizer marketing.

Table 20: Market Shares of Fertilizer for Various Sources

(percent)

Fertilizer	Source				
	PBDAC	Cooperatives	Traders	Others	Total
N46.6%	0.9	33.8	65.1	0.2	100
N33.5%	4.1	39.2	49.4	7.3	100
N20.6%	2.9	26.6	69.8	0.7	100
N15%	0	62.3	37.7	0	100
P46.5%	5.1	45.8	49.1	0	100
P15.5%	2	33.2	64.2	0.6	100
K48%	0	17.1	82.9	0	100

Source: APRP/MVE Endline Producer Survey, November 2001.

The overall changes in farmers' preferences for the best sources of fertilizer are illustrated in Table 21 for the 2000/01 season, along with the 1997 preferences determined in the baseline producer survey (Morsy et al., 1998).

Table 21: Changing Preferences About the Best Sources of Fertilizers

Suppliers	%		
	Baseline (1)	Endline (2)	Difference (2) - (1)
PBDAC	29	1	-28
Cooperatives	46	42	-4
Traders	16	43	27
Others	9	14	5
Total	**100**	**100**	**100**

Source: APRP/MVE Endline Producer Survey, November 2001for Endline, APRP/MVE Producer Survey, 1986/87 for Baseline.

This evidence suggests that between 1997 and now, the overall popularity of the private sector involved in fertilizer distribution expanded by 27%, while the shares of the cooperatives and the Bank shrunk by 5% and 28% respectively. This significant emergence of the private sector in the fertilizer market corroborates the positive impact of policy reforms under APRP on increasing private sector involvement in fertilizer distribution.

4.3 Public Awareness

The rationalization of irrigation water use is a central theme to the policy reforms introduced under APRP. The introduction of short-season rice varieties (SSVs) and improved sugarcane irrigation systems are the predominant era of focus. This section will examine the farm level awareness of these water optimization technologies.

4.3.1 Awareness of the Short-season Rice Varieties

Table 22 illustrates farmers' awareness of the short-season rice varieties in the rice- growing governorates. 99% of the sampled farmers know about the short-season rice varieties. Only Ismaileya governorate has an awareness rate of 50% because of its horticultural crop orientation.

Table 22: Awareness of the Short-Season Rice Varieties

(percent)

Governorate	No		Yes		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Sharqeya	2	2.08	94	97.92	96	100.00
Daqahleya	0	0.00	96	100.00	96	100.00
Kafr El Sheikh	0	0.00	72	100.00	72	100.00
Beheira	0	0.00	96	100.00	96	100.00
Ismaelia	1	50.00	1	50.00	2	100.00
Gharbeya	0	0.00	72	100.00	72	100.00
Total	3	0.69	431	99.31	434	100.00

Source: MVE Endline Producer Survey, November 2001.

Although the majority of farmers is strongly aware of short-season rice varieties, not all of them plant these varieties. Table 23 shows that only 85% of those who are aware of the short-season rice varieties plant them. The adoption of these varieties is best established in the Daqahleya Governorate.

Table 24 describes farmers' intentions to continue planting the short-season rice varieties in the future. Among those who plant these rice varieties, 96% intend to continue doing it. Farmers in Daqahleya have the highest intention rate to use these varieties again.

What motivates farmers to choose short-season rice varieties? Table 25 reveals the reasons why farmers intend to plant these rice varieties again. On top of the list, for the single category, is the higher productivity option for 28% of the respondents. The combined category "Higher Productivity + Water rationality + Shorter cycle" is the overall fist choice for 39% of the respondents. The observed increase in rice area during the summer season may be associated with the productivity gains obtained by adopting the short-season rice varieties.

Table 23: Farmers Planting Short-Season Rice Varieties

Governorates	No		Yes		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Sharqeya	46	49.5	47	50.5	93	100
Daqahleya	0	0	96	100	96	100
Kafr El Sheikh	2	2.8	70	97.2	72	100
Beheira	3	3.1	93	96.9	96	100
Ismaelia	0	0	1	100	1	100
Gharbeya	14	19.4	58	80.6	72	100
Total	65	15.1	365	84.9	430	100

Source: MVE Endline Producer Survey, November 2001.

Table 24: Intention to Plant Short-Season Rice Varieties

Governorate	No		Yes		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Sharqeya	45	48.39	48	51.61	93	100
Daqahleya	0	0.00	96	100.00	96	100
Kafr El Sheikh	6	8.33	66	91.67	72	100
Beheira	3	3.13	93	96.88	96	100
Ismaelia	0	0.00	1	100.00	1	100
Gharbeya	14	19.44	58	80.56	72	100
Total	**68**	**15.81**	**362**	**84.19**	**430**	**100**

Source: MVE Endline Producer Survey, November 2001.

When did farmers start using the short-season rice varieties? Table 26 shows farmers' recalls of the years they started using the short-season rice varieties. Results suggest that in 89% of the cases, farmers started using the short-season rice varieties from 1996 to 2001. Adoption of the short-season rice varieties started before APRP, but the project has provided a big push for their promotion. In 2002 the GOE decided that all price irrigation will end by August 31 instead of the usual September 30. In fact much progress was made toward that goal in 2001. It is this shift that allows MWRI to consolidate water savings from the use of SSVS.

4.3.2 Delinted Cotton Seed Varieties

Delinted cottonseed was supported by APRP, although not directly related to a policy benchmark. We will consider it here because of its linkages with the policy reforms introduced relative to cotton production. This section will look at farmers' opinions regarding delinted cotton seed and their level of sufficiency.

Table 25: Reasons for Planting Short Season Rice Varieties

(percent)

High Yield	27.9
Water Rationalization	1
Shorter Cycle	1
Lack of water	2
High Productivity + Water Rationalization	11.3
High Productivity + Less Time	9.9
High Product. + Water Rational. + Less Time	39
Others	7.9
Total	**100**

Source: MVE Endline Producer Survey, November 2001.

Table 26: Starting Dates for Planting Short Season Varieties of Rice

(percent)

Starting Date	Total
Before 1996	11
1996	17.6
1997	32.8
1998	21.8
1999	14.1
2000	1.7
2001	1.1
Total	100

Source: MVE Endline Producer Survey, November 2001.

Table 27 reveals farmers' opinions concerning the use of delinted cotton seed. Overall, 83% of the sampled farmers use delinted cotton seed in the cotton growing governorates. In the case of Daqahleya, the rate of use of delinted seed is under 30%.

Table 28 illustrates farmers' opinions regarding the availability of delinted cotton seed in the growing governorates. On average, 85% of the farmers agree that they received enough delinted seed; 15% of the surveyed farmers need more delinted seed. The rate of sufficiency reaches a perfect score of 100% in the governorates of Sharqeya, Gharbeya and Beni Suef. The lowest rate of seed sufficiency of 48% is achieved in the overnorate of Beheira.

Table 29 conveys farmers' reasons about delinted cottonseed insufficiencies in the cotton-producing governorates. Overall, 60% of those respondents not receiving enough seed believe that the total quantity of delinted seed is just not enough to cover all the needs. The second reason mentioned by the respondents is that the soil structure favors the use of more seed than required. The third reason mentioned is farmers' tendency to use more seed than necessary to guarantee germination. This risk-reducing strategy lowers the delinted seed sufficiency rate.

Table 27: Farmers Use of Delinted Cotton Seed

Governorate	No		Yes		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Sharqeya	0	0.0	53	100.0	53	100
Daqahleya	70	72.9	26	27.1	96	100
Kafr El Sheikh	0	0.0	49	100.0	49	100
Beheira	0	0.0	84	100.0	84	100
Gharbeya	3	60.0	2	40.0	5	100
Beni Suef	1	2.2	45	97.8	46	100
Minya	0	0.0	41	100.0	41	100
Assiut	0	0.0	52	100.0	52	100
Total	74	17.4	352	82.6	426	100

Source: MVE Endline Producer Survey, November 2001.

Table 28: Availability of Delinted Cottonseed by Governorate

Governorates	No		Yes		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Sharqeya	0	0.0	53	100.0	53	100.0
Daqahleya	4	15.4	22	84.6	26	100.0
Kafr El Sheikh	2	4.1	47	95.9	49	100.0
Beheira	44	52.4	40	47.6	84	100.0
Gharbeya	0	0.0	1	100.0	1	100.0
Beni Suef	2	4.4	43	95.6	45	100.0
Minya	0	0.0	41	100.0	41	100.0
Assiut	2	3.9	50	96.2	52	100.0
Total	54	15.4	297	84.6	351	100.0

Source: MVE Endline Producer Survey, November 2001.

Does using delinted seed have any impact on cotton production? Table 30 highlights farmers' opinions about planting delinted cottonseed. 68% of the respondents believe that the impact of delinted seed on cotton production is high, while 21% of the respondents think that the effect is moderate. Only 11% of the sampled farmers believe that delinted cottonseed has a low impact on cotton production. The producers from the governorates of Sharqeya and Gharbeya strongly support a high impact of delinted seed on production.

Table 29: Reasons Behind Insufficiencies in Delinted Cottonseed

(percent)

Quantity of seed is not enough	59.3
The soil structure	16.7
Using a lot of seed to guarantee germination	14.8
Quantity of seed is not enough+the soil structure	3.7
The Soil structure+lot of seed	5.6
Total	**100.0**

Source: MVE Endline Producer Survey, November 2001.

Table 30: Opinions About Cotton Production with Delinted Seed

(percent)

Governorate	High	Moderate	Low	Total
Sharqeya	100.0	0.0	0.0	100.0
Daqahleya	30.8	26.9	42.3	100.0
Kafr El Sheikh	75.5	8.2	16.3	100.0
Beheira	52.4	47.6	0.0	100.0
Gharbeya	100.0	0.0	0.0	100.0
Beni Suef	73.3	2.2	24.4	100.0
Minya	95.2	4.8	0.0	100.0
Assiut	43.1	37.3	19.6	100.0
Total	67.8	20.8	11.4	100.0

Source: MVE Endline Producer Survey, November 2001.

When did farmers start using delinted cotton seeds? Results (Table 31) show that 80% of the respondents believe that they started using the delinted seed between 1996 and 2001, mostly during the early years of APRP. It is not likely that APRP had an impact on adoption of delinted cotton seed (not did it attempt to).

Table 31: Starting Dates for Planting Delinted Cottonseed

(percent)

Before 1996	18.8
1996	30.5
1997	26.5
1998	11.1
1999	5.7
2000	2.9
2001	4.6
Total	**100.0**

Source: MVE Endline Producer Survey, November 2001.

4.3.3 Optimal Water Use for Sugarcane Production

Table 32 presents farmers' awareness of improved sugarcane irrigation systems in the governorate of Qena. The overall results establish that 94% of the sampled farmers are aware of them. Qena was chosen for this question because it was the location of the APRP pilot program on improved sugarcane irrigation systems, the villages sampled included pilot and non-pilot areas.

Table 32: Awareness of Improved Sugarcane Irrigation Systems, Qena

Governorate	No		Yes	
	No. of Farmers	Percent	No. of Farmers	Percent
Qena	3.0	6.0	46.0	94.0
Total	**3.0**	**6.0**	**47.0**	**94.0**

Source: MVE Endline Producer Survey, November 2001.

Table 33 emphasizes the proportion of the farmers in Qena who use these irrigation systems, when they are aware of their existence. Results show that overall only 34% of the respondents use them.

Table 34 displays the types of improved irrigation systems used by farmers in Qena governorate. Results reveal that 75% of farmers own an improved non-portable system, while the remaining 25% of the farmers operate a portable system. The non-portable system was tested first under the pilot program, but in the end the portable system was found to be cheaper and was the final recommendation of the APRP team.

Table 35 highlights the advantages associated with the use of the improved irrigation systems. Results emphasize that 31% of the respondents associate the gains of using the improved systems with increasing productivity and saving irrigation water.

Table 33: Use of Improved Sugarcane Irrigation Systems

Governorates	No		Yes		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Gharbeya	1.0	100.0	0.0	0.0	1.0	100.0
Qena	30.0	65.0	16.0	35.0	46.0	100.0
Total	31.0	65.0	16.0	35.0	47.0	100.0

Source: MVE Endline Producer Survey, November 2001.

Table 34: Type of Improved Sugarcane Irrigation System Used

Governorate	Non-Portable System		Portable System		Total	
	No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
Qena	12	75	4	25	16	100
Total	12	75	4	25	16	100

Source: MVE Endline Producer Survey, November 2001.

Table 35: Advantages of Using Improved Sugarcane Irrigation Systems

Saving Water		Saving Water + Higher Productivity		Saving Water+ Higher Productivity + Others		Total	
No. of Farmers	%	No. of Farmers	Percent	No. of Farmers	%	No. of Farmers	Percent
1	6.25	5	31.25	10	62.5	16	100

Source: MVE Endline Producer Survey, November 2001.

Table 36 focuses on the reasons for not using the improved irrigation systems. 90% of the respondents said that the lack of subsidies constrains farmers' use of these improved systems. On the other hand, the high cost of the project is perceived as the second factor associated with farmers' lack of interest in the new irrigation systems in 10% of the cases.

Table 36: Reasons for Not Using Improved Sugarcane Irrigation Systems

High cost for the Project		No Subsidies to the Project		Total	
No. of Farmers	Percent	No. of Farmers	Percent	No. of Farmers	Percent
3	10	27	90	30	100

Source: MVE Endline Producer Survey, November 2001.

4.3.4 Effectiveness of Cotton Floor Prices

Cotton price controls were abolished during APCP, and a floor price was set during APRP, to protect farm income. As a complementary measure, APRP suggested that only an indicative export price be announced weekly.

Farmers' awareness about the floor and export prices of cotton are illustrated in Table 37. Overall, 77% of the sampled farmers are aware of the floor prices of cotton, but only 5% of them are aware of the export price. Among the surveyed governorates, farmers in Beni Suef reveal the strongest rate of awareness about the floor price of cotton, while those in Gharbeya are the least informed.

Table 37: Farmers Informed About the Floor and Export Prices of Cotton

	Floor Price		Export Price	
	No	**Yes**	**No**	**Yes**
Percent	23.5	76.5	95.6	4.4

Source: MVE Endline Producer Survey, November 2001.

During the agricultural season 2000/01, the Government announced the floor price of seed cotton to sustain production. When did farmers learn of the floor price of cotton? Table 38 shows that in 2001 31% of the respondents had heard about the floor price before planting and 47% after harvesting. This is a positive new trend, as the GOE previously used to announce seed cotton floor prices just before the harvest. There was no specific policy benchmark requiring this change in the timing of the price announcement, but the change is consistent with other cotton-related policies promoted by APRP.

Table 38: Timing of Farmers' Knowledge About the Floor Price of Cotton

(percent)

Before Planting	31.1
During Planting	10.6
Before Harvesting	11.7
After Harvesting	46.5
Total	**100.0**

Source: MVE Endline Producer Survey, November 2001.

Since farmers are generally not aware of the export price of cotton, it would be unlikely that they benefit from it. Table 39 highlights farmers' opinions regarding whether knowing the export price of cotton benefitted from this knowledge. For 98% of the farmers, that knowledge did not effect their welfare. APRP made some attempts to set up market information systems at different levels, but non was successful in reaching farmers.

Table 39: Does a Farmer Benefit from Knowing the Export Price of Cotton?

(percent)

No	**98.3**
Yes	**1.7**

Source: MVE Endline Producer Survey, November 2001.

4.4 Output Markets

The ultimate goal of this section is to assess the impacts of APRP on output markets. This parts addressed a number of issues, namely:

- Extent of commercialization
- Competition structure and freedom in output markets

The study focused mainly on the commodities involved in the benchmarks of APRP and have been affected directly or indirectly by the program. Those commodities are cotton, rice, wheat, maize and horticulture.

4.4.1 Extent of Commercialization

Do Egyptian farmer still produce for autoconsumption; to what extent have they become more market oriented?. To answer this question, the study tried to investigate this issue by comparing the share of production sold 1997 and 2001.

Table 40 depicts the changes in the quantities sold of the main crops between 1997 and 2001. This share between 66% for rice and 81% for wheat compared to 97% for cotton and 99% for horticulture in 2001. The share sold in 2001 was higher than that in 1997 for all crops. The rate of change was 13% for rice, 22% for wheat, 9% for maize and 9% for horticulture.

It should be mentioned that cotton and horticulture are cash crops and are usually produced only for sale. Egyptian farmers have continued become more commercial during APRP, as well as changing their attitude regarding the cropping patterns based on comparative advantage and price signals. These changes are consistent with APRP's goals.

Table 40: Share of Production Sold in the Markets

(percent)

Crop	1997	2001	Change
Wheat	59	81	22
Rice	53	66	13
Maize	62	71	9
Cotton	97	97	0
Sorghum	45	89	44
Ground nut	99	99	1
Sesame	86	99	13
Orange	98	100	2
Mango	73	100	27
Guava	100	97	- 3
Lupines	97	100	3
Winter Potatoes	79	100	21

Sources: MVE/APRP endline producer survey, 2002; Assessment of 1997 Egypt Integrated Household Survey Data For Use in Constructing A Producer-Level Baseline, MVE Unit APRP, 1999.

4.4.2 Structure of Competition and Freedom in Output Markets

The Government of Egypt has agreed under its agricultural policy reform program to establish a free-market system for production and marketing of agricultural crops. The liberalization of the rice market started in 1991/92, while that for cotton began in 1993/94. Since then, many private companies and traders have been allowed to compete with public trading companies the in marketing of outputs. For wheat and maize, the compulsory delivery quota was canceled in1987.

This section summarizes the findings of the survey with regard to the liberalization of output markets in order to ascertain the reaction and behavior of producers toward this process. The questions addressed in this section:

- Freedom to market output
- Best marketing channel
- Extent of competition structure
- Changes in market shares
- Freedom to bargain output prices
- Price payment methods

Freedom to Market Crop Output. Are producers free to market their production? Table 41 displays the producers' attitudes toward freedom to market their outputs. The results indicate that all sampled producers in Daqahleya, Kafr Elshiekh and Assiut believed that the cotton market was not free, while all sampled producers in Behera, Beni Suif believed that there was freedom. For the whole sample 157 out of 391 cotton producers, represented about 40% of producers felt that they are free to market their products, compared to 2% in the base line producer survey (1997). The farmers justified their belief in 1997 giving two main reasons: First, about 70 percent of the farmers reported that there was only one buyer (compared to different buyers with high competition for getting cotton production in the previous year). Second, cotton traders in that year were in fact brokers: they bought cotton from farmers at lower prices and sold it in the marketing rings at the floor prices (MVE verification report No. 6, 1998).

It should be emphasized that the cotton market began to be liberalized in 1993/94. During the following two seasons, the private sector bought 31% and 57% of cotton production. In 1996/97 the Government set the floor price at a level higher than the world price; under this condition, the private sector refused to trade cotton. Farmers in each village faced only one buyer, and only a few local traders offered low prices for cotton and inaccurate weight. So the farmers felt that they were not free to market their products.

For wheat, rice and maize, all sampled producers believed that there was freedom in wheat, rice and maize marketing. Farmers can sell their products to different buyers and there is competition among them. Grain commodities can be stored for some time; if the buyers do not offer fair prices, farmers can wait until they get fair prices and benefit from the competition.

Table 41: Freedom to Market Outputs, by Crop Grown

(percent)

Governorates	Cotton		Wheat		Rice		Maize	
	Yes	No	Yes	No	Yes	No	Yes	No
Sharqeya	55	45	100	0	100	0	100	0
Daqahleya	0	100	99	1	100	0	100	0
Kafr Elshiekh	0	100	100	0	100	0	100	0
Behera	100	0	100	0	100	0	100	0
Imailia	0	100	100	0	100	0	100	0
Gharbeya	0	100	100	0	100	0	100	0
Beni Suif	100	0	100	0	-	-	100	0
Minya	11	89	100	0	-	-	100	0
Assiut	0	100	100	0	-	-	100	0
Qena	-	-	100	0	-	-	100	0
Total	40	60	100	0	100	0	100	0

- not available

Source: MVE/APRP Endline Producer Survey, 2001

The producers who believed that they are free to market their products were asked about the starting date of freedom; the results indicate that 84% of the cotton producers thought that freedom started under APRP, compared to 16% under APCP (Table 42). For wheat about 2 % of the producers saw that freedom started before APCP, compared to 57% under APCP and 41% under APRP. The same result was found for rice and maize, where the majority of producers felt that the freedom started under APCP. It should be mentioned again that the grain markets were liberalized under APCP, and producers have been enjoying that freedom since that time.

Table 42: Starting Date of Marketing Freedom, by Crop Grown

(percent)

Crop	Before APCP	Under APCP	After APRP
Cotton	0	16	84
Wheat	2	57	41
Rice	2	63	35
Maize	5	68	27

Source: MVE/APRP Endline Producer Survey, 2001

Best Marketing Channels. Table 43 shows the preferences for the best marketing channel from the producers' point of view. PBDAC, the private rings and the cooperative centers represent the main marketing channels of cotton. 47% of the surveyed producers prefer the PBDAC ring, 30% prefer the cooperative centers, and 13% prefer private rings, while only 4% prefer traders at the farm gate. The above figures point out that PBDAC and cooperative centers still represent the preferable marketing

channels for cotton, because farmers believe that they can get fair prices and the weighing would be done accurately. For wheat, rice and maize, the best marketing channel was local traders at farm gate.

Table 43: Best Marketing Channel, by Crop Grown

(percent)

	Cotton	Wheat	Rice	Maize
PBDAC rings	47.1	10.9	0.5	1.0
Cooperative rings	30.2	3.3	2.1	1.8
Private rings	13.4	-	-	-
Local traders	4.4	74	91.1	0.4

Source: MVE/APRP Endline Producer Survey, 2001

Confidence in getting the prices represent the main factor for preferring the marketing channel for cotton, followed by offering best price and paying cash on the spot. Farmers wait 2-3 weeks until they receive their prices; for this reason they prefer PBDAC and cooperative rings where there is confidence in getting the prices.

For wheat rice and maize, the majority of producers prefer to sell their product to traders at farm gate because they pay cash on the spot. The second reason explaining the best marketing channel was offering pest price. The other important combination was paying cash on the spot and providing inputs on credit.

Table 44: Criteria for Best Marketing Channel, by Crop Grown

(rank)

	Cotton	Wheat	Rice	Maize
Confidence in getting the price	1	-	-	-
Offer best price	2	2	3	2
Pay cash on spot	3	1	1	1
Provide inputs credit	-	3	2	3
Buy at farmgate	-	4	4	4

Source: MVE/APRP Endline Producer Survey, 2001.

Extent of Competition. This section examines the extent of competition in output markets by identifying the number of traders who operate in the village and who are based inside and outside the village. It should be pointed out that private traders coming to the farm gate are rare. They were found only in one village, Meet Sohael in Sharqeya governorate. Most cotton production is marketed through the PBDAC, cooperative centers and private rings. More than 90% of cotton producers said there were no local traders of cotton based inside or outside the village.

The number of traders based inside and outside the village plus PBDAC rings, cooperative centers and mills, reflects a high degree of competition in trading grain and also indicates that there is no restriction on transportation and trading of grain among the different governorates. Although competition is still

lower in cotton trading, it has improved compared to before the liberalization program, especially through the efforts during APRP to allow trading outside PBDAC rings.

Table 45: Distribution of Farmers' Estimates of the Number of Traders Inside the Village

(percent)

	0	1-3	4-6	>6
Cotton	95	3	2	-
Rice	-	41	46	13
Wheat	-	40	36	24
Maize	-	48	30	22

Source: MVE/APRP Endline Producer Survey, 2001

Table 46:Distribution of Farmers' Estimates of the Number of Traders Outside the Village

(percent)

	0	1-3	4-6	>6
Cotton	91	8	1	-
Rice	14	49	24	13
Wheat	21	51	18	10
Maize	34	42	16	8

Source: MVE/APRP Endline Producer Survey, 2001

Changes in Market Shares. Quantities bought by different parties could change due to the implementation of APRP measures or as a result of the services provided by each party (buyer). 51% of the sampled producers reported that since 1997 there was no change in the share of different buyers. Those producers were concentrated in Kafr El Shiekh, Behera, Ismaileya, Gharbeya, Beni Suef and Qena governorates, compared 49% who believed that there were changes in the market shares. Those producers were concentrated in Sharqeya, Daqahleya Minya and Assiut.

54% of the sampled producers of cotton thought that there was an increases in the quantities bought at PBDAC rings, in addition the quantities bought at cooperative centers have increased. The quantities bought by local traders of cotton and rice at the farm gate of wheat, rice and maize have increased as reported by about 95% of the producers (Table 47).

Freedom to Bargain about Output Prices. The producers' opinions regarding the freedom to bargain output prices are reported in Table 48. More than 90% of cotton, wheat and maize producers say they cannot bargain at PBDAC rings, cooperative centers, private rings and with factory agents, where the prices are fixed according to the grade and quality of the product. In the case of selling to local traders, grain producers and 53% of cotton producers bargain the prices of output with buyers, where there are several buyers and compete.

Table 47: Farmers' Estimates of Direction of Changes in Market Share

(percent)

		Cotton	Wheat	Rice	Maize
PBDAC rings	No change	10	14	83	28
	Increase	54	85	17	72
	Decrease	36	1	0	0
	Total	100	100	100	100
Cooperative rings	No change	11	13	38	13
	Increase	68	5	20	3
	Decrease	21	82	42	84
	Total	100	100	100	100
Traders	No change	44	3	4	3
	Increase	39	96	95	94
	Decrease	17	2	1	3
	Total	100	100	100	100

Source: MVE/APRP Endline Producer Survey, 2001

Table 48: Freedom to Bargain about Output Prices

(percent)

		Cotton	Wheat	Rice	Maize
PBDAC rings	No	99	98	17	91
	Yes	1	2	83	9
	Total	100	100	100	100
Cooperative rings	No	96	80	5	29
	Yes	4	20	95	71
	Total	100	100	100	100
Private rings	No	97	95	3	94
	Yes	3	5	97	6
	Total	100	100	100	100
Traders	No	47	10	1	6
	Yes	53	90	99	94
	Total	100	100	100	100

Source: MVE/APRP Endline Producer Survey, 2001

Table 49 contains the starting date of bargaining the output price. The data show that 93% of the cotton producers started bargaining under APRP. For wheat, rice and maize, 58%-68% of producers started bargaining under APCP and continued under APRP (Table 49). Again the cotton results are consistent with the efforts made under APRP to liberalize pricing and marketing of seed cotton.

Table 49: Starting Date of Bargaining Prices with Buyers

(percent)

Crop	Before APCP	Under APCP	Under APRP
Cotton	-	7	93
Wheat	3	58	39
Rice	3	62	35
Maize	6	68	26

Source: MVE/APRP Endline Producer Survey, 2001

Price Payment Methods. Payment method is one of the main criteria for preferring the best marketing channel. The study shows that 80%, 98% and 63% of cotton production sold on credit[1] to PBDAC, cooperative centers and private traders respectively. The prices of wheat, rice and maize were paid cash from the different marketing channels. Due to the high competition among the different buyers. They compete for the product and they offer incentives to farmers.

Table 50: Price Payment Method

(percent)

		Cotton	Wheat	Rice	Maize
PBDAC rings	Cash	20	99	100	96
	Credit	80	1	0	4
	Total	100	100	100	100
Cooperative rings	Cash	2	97	100	100
	Credit	98	3	0	0
	Total	100	100	100	100
Private rings	Cash	37	100	100	100
	Credit	63	0	0	0
	Total	100	100	100	100
Traders	Cash	100	99	98	99
	Credit	0	1	2	1
	Total	100	100	100	100

Source: MVE/APRP Endline Producer Survey, 2001

[1] The farmer receives partial only partial payment when he hands over his output and the rest of the payment, some time later.

4.5 Complementary Results

This section deals with the parallel surveys applied to institutions revolving around the agricultural producer. This information is mainly intended to complement farmers' qualitative appreciations of policy reforms introduced under APRP and previously discussed in other parts of this document.

4.5.1 Village Leaders

Table 51 shows the village leaders' opinions about short-season rice varieties. Like many other farmers, they are aware of the short season rice varieties. 84% of the respondents say that they know about them.

Table 51: Village Leaders' Awareness of Short-Season Rice Varieties

(percent)

	Yes	No	Total
Sharqeya	100.0	0.0	100.0
Daqahleya	100.0	0.0	100.0
Kafr El Sheikh	100.0	0.0	100.0
Beheira	100.0	0.0	100.0
Ismaileya	83.3	16.7	100.0
Gharbeya	100.0	0.0	100.0
Beni Suef	0.0	100.0	100.0
Minya	0.0	0.0	0.0
Assiut	0.0	0.0	0.0
Qena	0.0	0.0	0.0
Total	84.4	15.6	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

What do the village leaders think of the liberalization policies? Table 52 shows that village leaders see the liberalization policies as giving them the freedom to determine their cropping patterns, to market their outputs, and to choose their input suppliers.

Table 52: Positive Impacts of Liberalization Policies

(percent)

	Free to Choose Cropping Patterns	Free to Sell Crops	Better Prices	Free to Buy Inputs	Other	Total
Sharqeya	62.5	25.0	0.0	0.0	12.5	100.0
Daqahleya	36.4	54.5	9.1	0.0	0.0	100.0
Kafr El Sheikh	55.6	11.1	0.0	22.2	11.1	100.0
Beheira	42.9	35.7	0.0	21.4	0.7	100.0
Ismaileya	71.4	14.3	14.3	0.0	0.0	100.0
Gharbeya	14.3	57.1	14.3	0.0	14.3	100.0
Beni Suef	41.7	41.7	0.0	8.3	6.3	100.0
Minya	25.0	33.3	8.3	16.7	16.7	100.0
Assiut	27.3	18.2	0.0	18.2	36.3	100.0
Qena	16.7	50.0	0.0	16.7	16.6	100.0
Total	39.2	34.0	4.1	11.3	11.4	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

4.5.2 Extension Agents

Do farmers consult extension agents when choosing the cropping patterns? Table 53 shows that 76% of the extension agents said that they are consulted by farmers when choosing their cropping pattern. This conflicts with farmers' opinions, probably because the agents would like to inflate their own importance. The answers of the agents, however, are dramatically different by governorate.

Table 53: Extension Agents' Role in Determining the Cropping Pattern

(percent)

	No	Yes	Total
Sharqeya	25.0	75.0	100.0
Daqahleya	12.5	87.5	100.0
Kafr El Sheikh	0.0	100.0	100.0
Beheira	11.1	88.9	100.0
Beni Suef	100.0	0.0	100.0
Minya	100.0	0.0	100.0
Assiut	0.0	100.0	100.0
Total	23.8	76.2	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Are extension agents familiar with the different inputs available in the market in order to advise farmers properly? Table 54 shows that 81% of the extension agents think they have an acceptable level of understanding of the farm inputs to advise farmers adequately. Agents residing in Daqahleya and Gharbeya show the highest degree of confidence.

Table 54: Extension Agents' Knowledge About Farm Inputs

(percent)

	No	Yes	Total
Sharqeya	25.0	75.0	100.0
Daqahleya	0.0	100.0	100.0
Kafr El Sheikh	20.0	80.0	100.0
Beheira	12.5	87.5	100.0
Ismaileya	20.0	80.0	100.0
Gharbeya	0.0	100.0	100.0
Beni Suef	25.0	75.0	100.0
Minya	28.6	71.4	0.0
Assiut	20.0	80.0	0.0
Qena	50.0	50.0	0.0
Total	19.4	80.6	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

4.5.3 Input Traders

The percentage of traders involved in the distribution of various farm inputs is shown in Table 55. Overall, traders are more involved into fertilizer and pesticides distribution than seed or fodder. This is consistent with the producer survey, where findings emphasized that private traders dominate the fertilizer and the pesticide markets, while the cooperatives were the primary source of seed.

Table 55: Number of Traders per Category of Inputs

(percent)

Governorates	Seed	Fertilizer	Pesticides	Fodder	Total
Sharqeya	11.1	66.7	11.1	11.1	100.0
Daqahleya	20.0	30.0	50.0	0.0	100.0
Kafr El Sheikh	0.0	100.0	0.0	0.0	100.0
Beheira	33.3	33.3	33.3	0.0	100.0
Ismaileya	40.0	40.0	20.0	0.0	100.0
Gharbeya	23.1	53.8	23.1	0.0	100.0
Beni Suef	27.3	45.5	27.3	0.0	100.0
Minya	0.0	75.0	25.0	0.0	100.0
Assiut	14.3	35.7	21.4	28.6	100.0
Qena	25.0	50.0	25.0	0.0	100.0
Total	19.4	53.0	23.6	4.0	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Are private traders restricted in the sale of inputs? Table 56 shows that 88% of the traders believe that they sell farm inputs without any restriction.

Table 56: Restrictions on Input Sales

(percent)

	No	Yes	Total
Sharqeya	83.3	16.7	100.0
Daqahleya	60.0	40.0	100.0
Kafr El Sheikh	100.0	0.0	100.0
Beheira	100.0	0.0	100.0
Ismaileya	100.0	0.0	100.0
Gharbeya	100.0	0.0	100.0
Beni Suef	80.0	20.0	100.0
Minya	100.0	0.0	100.0
Assiut	83.3	16.7	100.0
Qena	100.0	0.0	100.0
Total	88.3	11.7	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

If input traders think that they can sell their inputs without any government restrictions, does that mean that the market is competitive? Table 57 reveals that 45% of the traders believe that the market is somewhat competitive, while 35% of them think that the market is competitive. This result matches the market share analysis based on the responses of the producers if we combine these two categories into one single answer (80%).

Table 57: Degree of Competition in the Input Market

(percent)

Governorates	High	Medium	Low	Total
Sharqeya	100.0	0.0	0.0	100.0
Daqahleya	60.0	40.0	0.0	100.0
Kafr El Sheikh	0.0	75.0	25.0	100.0
Beheira	12.5	75.0	12.5	100.0
Ismaileya	0.0	50.0	50.0	100.0
Gharbeya	20.0	40.0	40.0	100.0
Beni Suef	80.0	20.0	0.0	100.0
Minya	0.0	33.3	66.7	100.0
Assiut	33.3	66.7	0.0	100.0
Qena	50.0	50.0	0.0	100.0
Total	35.3	45.1	19.6	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

4.5.4 Cooperatives

Do the cooperatives provide information to farmers for their major agricultural activities? Table 58 shows that for the cropping patterns, 90% of the respondents believe they provide farmers with

information when they decide their crop mix. In the case of input procurement decisions, 93% of the respondent think that they give advice to farmers. For output selling decisions, the percentage is 76%. Regarding the cropping patterns, the farm level survey revealed that farmers mainly consult with other farmers, with neighbors and with family members. It is surprising that cooperative members think that they advise farmers on cropping pattern decisions. This may be an idea held over from previous times.

Table 58: Do the Cooperatives Supply Information to Farmers?

(percent)

	Cropping Patterns		Input Markets		Output Markets	
	No	Yes	No	Yes	No	Yes
Sharqeya	14.3	85.7	28.6	71.4	40.0	60.0
Daqahleya	0.0	100.0	0.0	100.0	37.5	62.5
Kafr El Sheikh	0.0	100.0	20.0	80.0	40.0	60.0
Beheira	12.5	87.5	0.0	100.0	12.5	87.5
Ismaileya	40.0	60.0	16.7	83.3	16.7	83.3
Gharbeya	28.6	71.4	0.0	100.0	14.3	85.7
Beni Suef	0.0	100.0	0.0	100.0	0.0	100.0
Minya	0.0	100.0	0.0	100.0	0.0	100.0
Assiut	0.0	100.0	0.0	100.0	33.3	66.7
Qena	0.0	100.0	0.0	100.0	50.0	50.0
Total	9.7	90.3	6.6	93.4	23.7	76.3

Source: APRP/MVE Endline Producer Survey, November 2001.

Table 59: Why do Farmers Prefer the Cooperatives?

(percent)

Governorates	Good Quality	Lower Price	Availability	Give Credit	Total
Sharqeya	50.0	50.0	0.0	0.0	100.0
Daqahleya	100.0	0.0	0.0	0.0	100.0
Kafr El Sheikh	100.0	0.0	0.0	0.0	100.0
Beheira	80.0	20.0	0.0	0.0	100.0
Ismaileya	66.7	33.3	0.0	0.0	100.0
Gharbeya	100.0	0.0	0.0	0.0	100.0
Beni Suef	62.5	12.5	12.5	12.5	100.0
Minya	66.7	22.2	11.1	0.0	100.0
Assiut	36.4	27.3	0.0	36.4	100.0
Qena	50.0	50.0	0.0	0.0	100.0
Total	64.3	23.2	3.6	8.9	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Farmers are free to purchase their inputs from their preferred sources. What are the reasons why they choose the coops? Table 59 reveals that farmers like the cooperatives first because of their good quality

inputs and also because of their lower prices. This information confirms farmers' preferences for their sources of inputs previously discussed. The type of inputs supplied by the cooperatives are shown in Table 60. Seed and fertilizer constitute two of their dominant inputs supplied to farmers. It was previously seen in the producer survey that seed, in particular, was best supplied by the cooperatives.

Table 60: Types of Inputs Supplied by the Cooperatives

(percent)

Governorates	Seed	Fertilizer	Pesticides	Fodder	Total
Sharqeya	43.8	25.0	31.3	0.0	100.0
Daqahleya	33.3	33.3	33.3	0.0	100.0
Kafr El Sheikh	33.3	33.3	33.3	0.0	100.0
Beheira	40.0	35.0	25.0	0.0	100.0
Ismaileya	33.3	33.3	33.3	0.0	100.0
Gharbeya	36.4	36.4	27.3	0.0	100.0
Beni Suef	31.6	31.6	31.6	5.3	100.0
Minya	46.2	38.5	15.4	0.0	100.0
Assiut	31.3	25.0	18.8	25.0	100.0
Qena	50.0	37.5	12.5	0.0	100.0
Total	37.1	32.7	27.0	3.1	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

4.5.5 Village Banks

The types of farm inputs supplied by the village banks are shown in Table 61. Overall, the banks are more specialized in fertilizer (40%) and seed (35%) than pesticides (27%).

Table 61: Types of Inputs Supplied by the Village Banks

(percent)

Governorates	Seed	Fertilizer	Pesticide	Total
Sharqeya	28.6	42.9	28.6	100.0
Daqahleya	42.9	42.9	14.3	100.0
Kafr El Sheikh	33.3	33.3	33.3	100.0
Beheira	31.3	37.5	31.3	100.0
Ismaileya	27.3	45.5	27.3	100.0
Gharbeya	38.5	38.5	23.1	100.0
Beni Suef	33.3	33.3	33.3	100.0
Minya	33.3	33.3	33.3	100.0
Assiut	50.0	50.0	0.0	100.0
Total	34.5	38.9	26.5	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Table 62 highlights the view of the banks' representatives whether farmers prefer their services or not. 79% of the respondents believe that farmers like their services. What are the reasons why farmers may prefer the village banks instead of the private traders or the coops? Table 63 shows that farmers like the village banks mostly because of their good quality inputs (27%), the credit line available (22%) and their proximity to farmers (15%). Governorate differences seem to reflect a difference in the candor of the respondents.

Table 62: Do Farmers Prefer the Village Banks?

(percent)

Governorates	No	Yes	Total
Sharqeya	0.0	100.0	100.0
Daqahleya	0.0	100.0	100.0
Kafr El Sheikh	0.0	100.0	100.0
Beheira	100.0	0.0	100.0
Ismaileya	66.7	33.3	100.0
Gharbeya	0.0	100.0	100.0
Beni Suef	0.0	100.0	100.0
Minya	0.0	100.0	100.0
Assiut	0.0	100.0	100.0
Total	21.3	78.7	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

Table 63: Why Do Farmers Prefer the Village Banks?

(percent)

Governorates	Easy to Deal With	Guaranteed Quality	Low price	Supply Credit	Near to Farmers	Others	Total
Sharqeya	0.0	20.0	20.0	60.0	0.0	0.0	100.0
Daqahleya	50.0	33.3	16.7	0.0	0.0	0.0	100.0
Kafr El Sheikh	0.0	42.9	14.3	42.9	0.0	0.0	100.0
Ismaileya	100.0	0.0	0.0	0.0	0.0	0.0	100.0
Gharbeya	25.0	8.3	0.0	8.3	25.0	33.3	100.0
Beni Suef	0.0	42.9	14.3	0.0	14.3	28.6	100.0
Minya	6.3	25.0	12.5	31.3	18.8	6.3	100.0
Assiut	0.0	33.3	16.7	16.7	33.3	0.0	100.0
Total	13.3	26.7	11.7	21.7	15.0	11.7	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

4.5.6 Cotton Traders

The level of competitiveness among cotton traders is shown in Table 64. 57% of the respondents believe that the level of competition is moderate, while the remaining 43% think that the level of competition is low.

Table 64: Level of Competitiveness Among Cotton Traders

(percent)

Governorates	High	Moderate	Low	Total
Sharqeya	0.0	0.0	100.0	100.0
Kafr El Sheikh	0.0	100.0	0.0	100.0
Beheira	0.0	75.0	25.0	100.0
Gharbeya	0.0	0.0	100.0	100.0
Total	0.0	57.1	42.9	100.0

Source: APRP/MVE Endline Producer Survey, November 2001.

4.5.7 Cereal Traders

The percentages of cereals handled by traders coming from different sources are illustrated in Table 65. Overall, 89% of the wheat purchased is from farmers. The equivalent rates for maize and rice are respectively 89% and 81%. Intermediaries play a modest role in collecting cereals. Table 66 shows the shares of different cereals in the traders' transactions. 50% of the quantity handled by traders is wheat; maize and rice count for 34% and 16% of the transactions, respectively.

Table 65: Cereals Traders' Sources of Grain

(percent)

Governorates	Wheat		Maize		Rice	
	Farmers	Intermediaries	Farmers	Intermediaries	Farmers	Intermediaries
Sharqeya	100.0	0.0	100.0	0.0	100.0	0.0
Daqahleya	57.1	42.9	60.0	40.0	60.0	40.0
Kafr El Sheikh	100.0	0.0	100.0	0.0	100.0	0.0
Beheira	100.0	0.0	100.0	0.0	75.0	25.0
Ismaileya	75.0	25.0	75.0	25.0	66.7	33.3
Gharbeya	100.0	0.0	100.0	0.0	100.0	0.0
Beni Suef	100.0	0.0	100.0	0.0		
Minya	100.0	0.0	83.3	16.7		
Assiut	100.0	0.0	100.0	0.0		
Qena	50.0	50.0	50.0	50.0		
Total	89.4	10.6	88.6	11.4	80.6	19.4

Source: APRP/MVE Endline Producer Survey, November 2001.

Table 66: Composition of Traders' Transactions, by Cereal

(percent)

Governorates	Wheat	Maize	Rice	Total
Sharqeya	34.3	13.7	52.0	100
Daqahleya	19.5	0.0	80.5	100
Beheira	29.3	1.4	69.3	100
Ismaileya	43.3	49.2	7.5	100
Gharbeya	23.2	23.2	53.6	100
Beni Suef	50.0	50.0	0.0	100
Minya	55.6	44.4	0.0	100
Assiut	57.9	42.1	0.0	100
Qena	67.6	32.4	0.0	100
Total	49.5	34.3	16.2	100

Source: APRP/MVE Endline Producer Survey, November 2001.

4.6 Changes in Gross Margins, 1997 to 2001

In order to assess the impact of policy reforms (or any other set of factors) on gross margins, one needs a set of baseline and endline data. These would permit a before-after comparison, which, while not ideal, might be sufficient for current purposes. The following is a description of the attempt by the MVE Unit to collect or otherwise obtain both baseline and endline data on household or farm income for use in such an analysis.

4.6.1 Potential Baseline Datasets

In the early stages of APRP, the MVE Unit was extremely busy with the task of benchmark verification. It carried out a small farm-level survey in 1997 to verify certain benchmarks. The Unit did not have time in 1997-98, however, to conduct a full farm-level survey, one that would collect data sufficiently carefully and in sufficient detail to make credible estimates of farm income or gross margins for major crops. Moreover the Unit felt this largely unnecessary, as there were plans for the FSR Unit of APRP (staffed by IFPRI) to conduct a survey that might fulfill the same purposes.

The FSR Unit planned to carry out a nationally representative household survey, primarily for the purpose of conducting demand analysis and deriving food security implications. However, the survey instrument included many questions about farm inputs and outputs. Thus it was hoped that, using IFPRI surveys of household income and expenditures, changes in farm household welfare during APRP could be 1) assessed and 2) linked to the cultivation of various crops and the effects on them of APRP policies. Within the sample of about 2,500 households, about one-quarter were considered farm households. The first survey was conducted in 1997; however, although it was proposed, there was no second IFPRI survey.

Thus MVE was left to rely on other sources of data for a baseline if it wished to assess the impact of policy reforms on farm income/gross margins for the major crops or major rotations. To this end, MVE

did a literature review of previous farm studies. This review found that the MALR/RDI farm income data and MALR/GTZ farm surveys of cotton and other major crops were the only ones that might be usable as baselines because of their apparently careful methods and sampling, and because of the types of data collected. Each of these data sources covers two (different) governorates for 1997[2]. No apparently reliable dataset was found with wider coverage. Moreover, data from the MVE endline farm survey (2001) show that, crop by crop, averages of gross margins in Gharbeya and Assiut are generally similar to national (10-governorate) averages of gross margins (see Table 67). This created the hope that the 1997 MALR/RDI data for Gharbeya and Assiut could be used as a baseline.

Table 67: Gross Margins, 2001

(LE/feddan, current prices)

	Gharbeya and Assiut	Ten Governorates
Cotton	2269	2173
Rice	1068	1050
Wheat	1441	1289
Maize	1068	814
L. Berseem	1700	1638
Sh. Berseem	403	478

Source: MVE Endline Producer Survey, 2001.

Tables 68 and 69 show the data for gross margins per feddan for major crops in 1997 from the MALR/RDI and MALR/GTZ surveys. Data for gross margins by major crop rotation are consistent with the gross margins by crop for each data source.

Table 68: Gross Margins, 1997 and 2001, Gharbeya and Assiut

(LE/feddan, current prices)

	Gharbeya			Assiut		
	1997	**2001**	**% Change**	**1997**	**2001**	**% Change**
Cotton	837	2683	221	819	1854	126
Rice	685	1068	156	0	0	0
Wheat	730	1381	89	720	1501	108
Maize	289	1041	260	560	1095	96
L. Berseem	795	1480	86	1308	1919	47
Sh. Berseem	138	507	267	169	299	77

Sources:1997: MALR/RDI Cost of Production and Farm Income Study, 1999;
2001: MVE Endline Producer Survey, 2001.

[2]The coverage of this dataset in terms of governorates has expanded for each subsequent year. However for the purpose of assessing the impact of APRP, it was essential to have a baseline for the beginning of the project.

Table 69: Gross Margins, 1997 and 2001, Daqahleya and Beni Suef

(LE/feddan, current prices)

	Daqahleya			Beni Suef		
	1997	**2001**	**% Change**	**1997**	**2001**	**% Change**
Cotton	1851	1639	-11	1261	1531	21
Rice	1377	1412	3	N/A	N/A	N/A
Wheat	874	1360	56	864	1170	35
Maize	634	710	12	533	531	0
L. Berseem	1417	1313	-7	1161	1319	14
Sh. Berseem	327	466	43	255	382	50

Sources:1997: MALR/GTZ1997 Farm Survey, Daqahleya & Beni Suef, 1998;
2001: MVE Endline Producer Survey, 2001.

In order to see whether gross margins have changed from 1997 to 2001, the data for 1997 were paired with data for the same governorates from the 2001 MVE endline survey (Tables 68 and 69). When one examines the changes in gross margins, one sees that increases are very large relative to the MALR/RDI data and much smaller or almost none relative to the MALR/GTZ data (Table 70). Moreover the relative ranking of the changes by crop is also quite different. It does not seem, therefore that one or the other of these datasets could be used individually to represent the situation in Egypt as a whole. In general, the smaller changes in gross returns seem more likely, but the apparent care with which the MALR/RDI data were also collected gives the authors pause. Thus the conclusion of the authors is that there is not a sufficiently reliable, compatible, and sufficiently broad baseline of gross margins (or farm income) for 1997 or thereabouts with which the 2001 MVE data can be compared.

Table 70: Change in Gross Margins, 1997 to 2001

(Percent)

	Gharbeya	**Assiut**	**Gharbeya and Assiut**	**Rank**	**Daqahleya**	**Beni Suef**	**Daqahleya and Beni Suef**	**Rank**
Cotton	221	126	***174***	*1*	-11	21	***2***	*5*
Rice	156	0	***156***	*3*	3	N/A	***3***	*4*
Wheat	89	108	***99***	*5*	56	35	***46***	*1*
Maize	260	96	***152***	*4*	12	0	***6***	*3*
L. Berseem	86	47	***62***	*6*	-7	14	***2***	*5*
Sh. Berseem	267	77	***163***	*2*	43	50	***46***	*1*

Sources: 1997, Gharbeya and Assiut: MALR/RDI Cost of Production and Farm Income Study, 1999;
1997, Daqahleya and Beni Suef: MALR/GTZ1997 Farm Survey, Daqahleya & Beni Suef, 1998;
2001: MVE Endline Producer Survey, 2001.

NB: The changes in gross margins for the pairs of governorates were calculated from the averages of the absolute values of the gross margins, not from the individual percent changes. Because the absolute values of the changes are sometimes quite different for the two governorates paired, the percent change for the pair is often not the same as the average of the percent changes for each governorate.

4.6.2 Potential Conclusions about the Impact of APRP

In the absence of reliable baseline and endline date, it is still possible to discuss whether APRP had a strong impact at the farm level, based on the presumable effects of APRP policy reforms on specific components of gross margins.

Table 71: National Average Crop Yields

(Per feddan)

	1997	2001	% change
Cotton (Qentars)	6.80	7.23	6.3
Rice (Tons)	3.54	3.91	10.5
Wheat (Ardab)	15.68	18.40	17.3
Maize (Ardab)	22.47	24.26	8.0
L. Berseem (Tons)	25.76	28.25	9.7
Sh. Berseem (Tons)	10.89	12.54	15.2

Source: EAS/MALR, *Agricultural Statistics*, various issues.

Effect of APRP policy reforms on input use and prices and on yields. According to official data, the trend of yields of most crops in Egypt has been upward in the 1990s. Table 71 shows official MALR data for the major field crops for 1997 and 2001. The same trend is evident. However, it should be pointed out that the yield trend for cotton has not been strongly upward since the beginning of serious policy reform in 1986; it has been modest, at about 1 percent per year. Thus the trend apparent (more than 1.5 % per year) in Table 77 is an artifact of the particular years shown. The yield of rice, on the other hand, has been going up because of the introduction and adoption of higher-yielding short-season varieties (SSVs). While the original introduction of SSVs is not an APRP project impact**S** it started before APRP**S** the project took advantage of their increasing use to obtain significant irrigation water savings.

Since APRP is not likely to have had a significant impact on either the use of improved seed or the amount of fertilizer applied (either directly or through changes in its price, which were almost nil), it is unlikely that APRP reforms had any significant impact on the yield of major field crops (nor were they conceived for this purpose).

4.6.3 Effects of APRP Policy Reforms on Output Prices

As a project that targeted the marketing and processing of crops more than their production, APRP is more likely to have had an impact on output prices than on inputs and yields. The following is a summary of APRP thrusts and reforms relative to cotton and rice. APRP did not target reforms at the producer prices of wheat or maize.

When APRP began, the GOE had set a very high floor price for seed cotton, due to a previous apparent trend in the world market that shifted rapidly. APRP staff proposed that the GOE adopt a deficiency payment scheme. The purpose of this scheme was not to change the price directly, but

rather to lower the cost of the price support program to the GOE. The deficiency payment scheme was adopted. In the following years, APRP urged the GOE to lower the floor price of seed cotton, as it was not sustainable and precluded the involvement of the private sector in the marketing of seed cotton, one of APRP's major goals. The GOE did indeed lower the floor price for seed cotton gradually. APRP strove for liberalization of the domestic cotton market and some progress was made. However the market was not completely liberalized, and prices are not yet set by supply and demand. In particular there is still limited competition to buy seed cotton at PBDAC rings, at which there is still only one buyer. Private agents are allowed to operate their own buying rings, and some do. In these cases, there is sometimes competition for specific varieties, especially when the crop is smaller. Thus in a few cases the effect of the small increase in competition, partly due to APRP, is a higher price for the farmer. In general price differentials between different grades of seed cotton are still set, and set too low, to encourage farmers to produce the kind of high-quality seed cotton that they produced even in the 1950s. Despite studies on this topic, APRP was not able to get this changed. In summary, the effect of APRP on the pricing of seed cotton has been limited. It urged lower prices when they were too high, and promoted higher prices through competition, which succeeded only to a limited extent.

The domestic rice market was largely liberalized before APRP began. Thus prices have been varying, as they should, mostly with supply and demand factors. APRP supported the privatization of public sector rice mills through employee stakeholder associations (ESAs). The ESA mills, however, are still largely under the control of the GOE. When they receive credit from the public banks early in the season, they are often used as a tool of GOE policy to buy paddy at a support price higher than the market price. APRP has not lobbied strongly either for or against this practice, although MVE analysts find that it goes against the APRP goal of promoting the role of the private sector in marketing. APRP also supported the creation of the Agricultural Commodity Council (ACC) and its rice subcommittee. The latter lobbied successfully for an export subsidy using as an excuse the imposition of a high support price (which because of its timing in the marketing year probably did not reach farmers). Thus, in rice APRP has probably had almost no effect on the price of paddy, despite its valuable contributions to saving water through SSVs and through its support for policy advocacy by the ACC.

The MVE Unit's concluding study on the wheat subsector found that farmers were now selling a significantly higher proportion of their production. It is not clear why this is the case, since the producer price has not been raised substantially. In any case, there was no effort through APRP to influence wheat prices or returns. Numerous studies under the project, however, including those of MVE, called for reforms in the wheat subsector that would allow wheat farmers to sell their product to any buyer. Such competition for their product might lead to higher prices.

There are no presumed effects of APRP on the prices of any other major crops like maize or horticultural products, as there were no relevant benchmarks in these areas.

4.6.4 Concluding Thoughts

The MVE endline farm level survey dataset provides a good baseline for future projects (see chapter 2 above), and the MALR data should as well if their coverage continues to increase and if their

accuracy is maintained. The lack of a suitable baseline for this study reinforces the importance of the farm income data work begun under APRP and the need to continue it.

REFERENCES

Ender, Gary. **Accomplishments in Agricultural Policy Reform In Egypt, 1997-2001**. MVE Unit - APRP, Impact Assessment Report No. 19. Abt Associates Inc. Cairo, Egypt. April, 2002.

Fletcher, Lehman, ed. **Egypt's Agriculture in a Reform Era.** Iowa State University Press. Ames, Iowa, USA. 1996.

Morsy Ali Fawzy, Ahmed Qadery M. Bahloul, Mohamed A. Meselhi, Mohamed Sayed Saeed, and Usama Ahmed El Bahnasawi. **Producer Survey Results, APRP-Tranche I.** MVE Unit-APRP, Verification Report No. 6. Abt Associates Inc. Cairo, Egypt. March, 1998.

Gleason, Jane and Sayed Hussein. **Study on Cost of Production and Farm Income Data for the 1997-98 Agricultural Season, Volume I.** MALR, RDI Unit - APRP, Report No. 89, December, 1999.

Holtzman, John and Adel Mostafa. **The Cotton/Textile Subsector in Egypt: Impacts of Policy Reform.** MVE Unit - APRP, Impact Assessment Report No. 26. Abt Associates Inc. Cairo, Egypt. July, 2002.

Holtzman, John, Abdel-Rahim Ismail and Samar Maziad. **The Impact of Policy Reform on the Rice Subsector in Egypt.** MVE Unit - APRP, Impact Assessment Report No. 25. Abt Associates Inc. Cairo, Egypt. July, 2002.

Selzer, Thomas. **Results of the 1997 Farm Survey In Daquahlia and Beni Suef.** GTZ/CSPP Project Report No. 58. 1998.

Zalla, Tom and Abdel-Hamid Youssef Saad, **Fertilizer Production and Marketing in Egypt: Baseline Study.** MVE Unit - APRP, Impact Assessment Report No. 2. Abt Associates Inc. Cairo, Egypt. December, 1998.

ANNEXES

ANNEX A: REVIEW OF LITERATURE ON FARM INCOME

Egyptian agriculture faces a number of limiting factors that affect the rate of growth in the sector. The limited area of the old land and the encroachment of urbanization on this land is one of these major factors. Combined with high rate of population growth, this limited area reduced the size the farm holdings. Not only that, but the inheritance system has led to the fragmentation and scattering of these farm holdings. Within the second half of last century, the Government of Egypt paid more attention to the development of the non-agricultural sectors, with little investments assigned for the development of the agricultural sector (only about 8-10 percent of the national investment funds). Consequently, farm incomes have been and still are relatively low in comparison with incomes in the other sectors of the economy, as has been indicated in the limited and scattered information available . This has led the GOE in the last few years to pay more attention to the neglected sector and to assign more investment to the rural areas in the current and future development plans. However, the efficient allocation of investment funds requires accurate data on family income, its sources, and its distribution among the rural population. Until recently, the available information and studies are limited to the functional distribution of agricultural income (the distribution of incomes according to the factors of production used in the process). Very little attention was given to the personal distribution of income (farm family and per capita) which is essential for the identification of the poverty line and poverty regions. Such information is a prerequisite for policy makers before making any plans to alleviate poverty in the rural areas.

Within the last twenty years, a number of studies have been involved in the estimation of family incomes and the changing pattern of rural life and the impacts on the changing structure of the sources of rural family incomes and the distribution of that income. Many of these studies included, beside the estimation of family income, investigations in the socio-economic characteristics of the farm managers; the structure of the sources of the family income; factors affecting that income whether farm income or non-farm income; the impact of the size of holdings on farm and non-farm income; patterns and trends in rural family consumption; the estimation of food and non-food consumption functions; and the trends in savings and investments for the farm families.

This report includes a brief review of a number of such studies on farm and off-farm income in addition to costs of production for some major crops. The sampling methodology for these studies was scientifically appropriate, mainly stratified random sampling, which is most suitable for such studies. However, the selection of areas included in this study was based on geographic representation of Lower and Upper Egypt. A governorate was selected from Lower Egypt (Beheira, Daqahleya, Sharqeya or Menoufeya and another one from Upper Egypt (Fayoum, Beni Suef, Minya or Assiut). These governorates produce mainly field crops; the specialized areas were not included in this study. Areas around Cairo located in Qalyubeya and Giza are mainly specialized in the production of horticultural crops (mainly vegetables and fruits -- high value crops). Areas in the extreme north of the Delta are mainly rice-producing farms. Areas far away in Upper Egypt have cultivated mainly sugar cane for a number of years. Such specialized areas were not included in the studies covered by this report. Therefore, the results of this report can hardly be generalized to represent the total population of farms in Egypt.

The sources of rural family income are income from farming and off farm income. The main sources of

farm income are the income from plant production and the income from livestock production. The sources of the off-farm income are the following three sources:

Off-Farm Fixed Sources: These are the sources of the monthly or yearly fixed salaries, pensions, subsidies, and rentals.

Off-Farm Variable Sources: These are the irregular sources like commercial, services and / or handicraft activities.

Off-Farm Power Inputs: These are the incomes obtained from the hiring of farm power resources whether human, draft animal and/or farm machinery to other farms or outside the farm..

The main results of these studies can be summarized as follows. The main factors affecting the level of farm and off-farm incomes are: size of farm, size of family, number of labor force in the family, number of working days on the farm, number of working days outside the farm, labor wages, number of educated persons in the family, number of employees outside the farm, farm savings, farm investments, size of livestock and the stock of farm machinery.

Fixed costs accounted for 52-61 percent of the total costs, with the maximum in long berseem-maize rotation and the minimum wheat-rice rotation. Income from plant production accounted for 36.7 percent of the family annual income, labor income 28.9 percent, income from livestock production 20.8 percent, income from overseas work 5.7 percent, income from farm machinery 4.1 percent, and non-farm income 3.3 percent. Power inputs represented the major component of the variable costs, accounting for 78-82 percent, with a maximum in short berseem-cotton rotation due to the large amount of labor input required for cotton picking and insect control.

Small farms were more efficient, realizing higher net profit per feddan for most crops and several crop rotations than other farm size categories. Tiny farms realized the least net returns per feddan. Large farms realized the highest total returns but not the lowest cost. Capital assets increased at a higher rate in the small farms than other farm sizes, represented mainly in farm animals (cows and buffaloes), irrigation pumps and tractors. Family labor is the major component of human power while hired labor represented a small proportion. This was the opposite in large farms.

Salaries represented 69-82 percent of the fixed off-farm income, but declining from 75-89 percent in the first farm size category to47- 82 percent in the second, 73-95 percent in the third and 3-45 percent in the fourth category. Pensions and insurance accounted for 10-26 percent while rentals accounting for5- 7 percent, and subsidies 1 percent. Off-farm income from services accounted for 43 percent of the income from variable sources in Sharqeya, but varied from 0.0 to 100.0 percent among the different farm size categories. Commercial activities contributed 30 percent and handicrafts contributed 27 percent of the variable income. In some areas, like Fayoum, handicrafts contributed 81 percent of the variable off-farm income, but varying from only one percent in the fourth category to 100.0 percent in the second and third categories.

Commercial activities contributed 15 percent and services contributed about 4 percent of the variable

off-farm income. Off-farm income from family labor working accounted for 57 percent of the off-farm income generated from power sources, but decreasing from 97 percent in the first farm size category to 29 percent in the second, 21 percent in the third, and to 2 percent in the fourth category. Off-farm income from machinery contributed 43 percent of the power income, but increased from 3 percent in the first category to 71 percent in the second to 79 percent in the third to 98 percent in the fourth category. Off-farm income from farm machinery represented 51 percent of the off-farm power income, but varying from 0.0 to 100.0 percent among the different farm size categories. Income from family labor working off-farm accounted for 45 percent, but varying from 4 to 100 percent. Draft animals contributed just about 4 percent of the off-farm income from power sources.

The average annual working days amounted to 52.3 days on the farm and 60.8 days off the farm. Hired labor was much higher than family labor and was higher for men than women. About 81.8 percent of the sample farmers work only on the farm while 18.2 percent have off farm jobs. About 90 percent of the farm operators were men while 10 percent were women. Farm size amounted to 2.45 feddans on the average, but varied from 2.79 feddans in Beheira and 1.95 feddans in Minya. Cropping intensity amounted to 1.6 for the whole sample, but was 1.61 in Minya and 1.58 in Beheira. The rate of dependency amounted to 1.4. The average annual income from working amounted to LE 571.2 in general, but reached LE 623.4 in Beheira and LE 497.2 in Minya.

The annual income for the farmer-operator amounted to LE 848.0 but reaching LE 587.0 for the wife and LE 346.5 for the son, with the total income for the family amounting to LE 2,783. Annual loans for the farm family amounted to LE 386.7 on the average, but varied from LE 559.3 in Beheira to LE 142.3 in Minya. The poverty line, as measured by the value of the necessary consumption expenditures for food and non food goods, amounted to LE 3134 for the family and LE 453 per person. This line is about ten and nine times those of 1974/75 for the family and per person respectively. This is due to the increase in the general level of prices as the quantities of commodities were fixed for the estimates made in 1974/75 and 1989/90 by FAO.

Based on cropping index, small farms ranked first, while all other farm categories were almost equal. The high crop intensity on small farms might be due to the great effort on the part of farmers to increase the efficiency of their limited land resources and increased cultivation of vegetable crops with short growing season and high value. Beni Suef ranked first before Gharbeya with respect to the cropping index. Rented holdings ranked after owned holdings but ranked before the mixed tenure holdings.

The ratio of total income to total costs (benefit to cost ratio) was higher for the owned farms than the rented farms and the mixed rentals. For the three types of land tenure, the benefit/cost ratio increased with the increase in farm size. The ratio was higher for Gharbeya than Beni Suef. Net income per feddan was higher for the owned land than both the rented and the mixed tenure lands. Owned land provided higher net income per feddan than both rented land and mixed tenure. For all farm size categories, net income per feddan in Gharbeya was higher than that in Beni Suef.

Net income per crop per feddan was higher in the owned lands than both the rented land and the mixed tenure. Gharbeya provided higher net income per crop per feddan than that of Beni Suef.

ANNEX B: FARMERS QUESTIONNAIRE

ANNEX C: SUPPLEMENTARY QUESTIONNAIRE